

Publication status: This preprint has not been published elsewhere.

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<https://doi.org/10.1590/SciELOPreprints.14901>

Submitted on: 2026-01-20

Posted on: 2026-01-21 (version 1)

(YYYY-MM-DD)

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Abstract

Nutritional Stunting Across Socioeconomic Contexts: Uncovering the Nuances of the Nutrition Transition in Barra do Corda, State of Maranhão

Introduction: Nutritional transition reflects shifts in population dietary patterns, typically marked by reduced protein-energy malnutrition alongside rising overweight and obesity. **Objective:** This study aimed to assess the nutritional status of children in Barra do Corda, Maranhão, Brazil. **Methods:** A cross-sectional study included 509 children from various income strata. Anthropometric indicators—stunting, underweight, wasting, overweight, and obesity—were measured. Associations with maternal education, school type, and participation in income transfer programs were analyzed. **Results:** Overall, 12% of children were stunted, 4.1% underweight, 1.8% wasted, 14.1% overweight, and 4.9% obese. Among stunted children, some also showed overweight or obesity, reflecting the double burden of malnutrition. Stunting was more prevalent among children of mothers with lower education (17.1% vs. 9.6%; PR=1.95; 95% CI=1.22–3.12; p=0.007) and tended to be lower among private school attendees. Overweight and obesity were significantly higher in children of more educated mothers and lower among Bolsa Família beneficiaries (12.8% vs. 21.8%; PR=0.58; 95% CI=0.28–0.96; p=0.050). Mean height-for-age, weight-for-age, and BMI-for-age z-scores were lower among children in income transfer programs and those with mothers of low schooling. **Conclusion:** In Barra do Corda, the nutritional transition coexists with persistent food insecurity among the poorest families, demonstrating socioeconomic disparities in child nutrition and emphasizing the need for targeted public health strategies.

Keywords: Nutrition transition, Stunting, Malnutrition, Obesity, Cash Transfer Programs.

INTRODUCTION

Nutritional transition refers to a shift in the nutritional profile of a population. It is often associated with a decline in protein-energy malnutrition alongside a rise in overweight and obesity prevalence¹. It constitutes a key dimension of the broader demographic and epidemiological transitions and unfolds within a complex sociohistorical context characterized by urbanization, industrial development, demographic concentration, and the transformative effects of the Green Revolution—particularly the increased agricultural productivity and consequent reduction in food prices^{2,3}. These structural changes have significantly reshaped patterns of food access, consumption, and nutritional status at the population level⁴. Popkin et al. (1996)⁵ highlight that in low- and middle-income countries, demographic and economic changes accompanied by rising incomes and food availability have driven a shift from under- to overnutrition⁵. Similarly, Leocádio et al. (2021)⁶ describe how increased access to Western-style, high-calorie diets in settings of poverty reduction contributes to this transition. This dynamic is further supported by FAO (2024)⁴, which links income growth to reduced undernourishment and increased consumption of ultraprocessed foods.

Stunting is recognized as a chronic form of malnutrition, characterized by impaired linear growth despite normal weight-for-height and body mass index (BMI) parameters⁷. This condition reflects a sustained deficit in height-for-age and is often linked to environments where caloric intake is sufficient but dietary quality is compromised—particularly in terms of inadequate protein and micronutrient intake⁸. Stunting has a network of interconnected and hierarchical determinants at the basic, underlying, and immediate levels, including maternal and paternal education, income, sanitation, and health services access⁸. Emerging evidence has identified a paradoxical association between stunting and elevated body mass index values, suggesting a complex interplay between chronic undernutrition and excess adiposity. Evidence from both the Marshall Islands, Africa and Brazil reveal the coexistence of stunting and elevated BMI (or maternal overweight) within the same households or municipalities—a manifestation of the double burden of malnutrition that arises in settings undergoing nutritional transition^{10,11,12}. In Brazil, the nutritional transition among children is

clearly evidenced by the findings of the Brazilian National Survey on Child Nutrition (ENANI-2019). Between 2006 and 2019, the prevalence of overweight and obesity among children under five years of age rose from 6% to 10.1%, while the prevalence of stunting remained relatively stable at approximately 7%¹³.

Cash transfer programs have played an important role in reducing the prevalence of protein-energy malnutrition on a global scale, with an impact on both the weight and height of beneficiary children¹⁴. In this way, the nutritional transition in developing countries occurs in parallel with the nutritional recovery of families living in poverty and extreme poverty, still facing food insecurity and, at times, hunger¹⁵. This may shape certain manifestations of the nutritional transition, particularly when considering that stunting may be associated with both undernutrition and overweight.

Maranhão has historically been one of the Brazilian states with the highest proportion of people living in poverty, currently ranking first, with 51.6% of its population living on a per capita household income of less than US\$ 6.85 per day, equivalent to approximately R\$ 637 per month. When considering extreme poverty—defined as a per capita household income below US\$ 2.15 per day (around R\$ 209 per month)—Maranhão also ranks first, with 15.9% of its population living under these conditions. In 2022, the state of Maranhão had the highest prevalence of underweight in children (9%), with a stunting rate of 19%¹⁶. In Maranhão, around 40% of households receive benefits from income transfer programs¹⁷.

This study seeks to analyze the influence of income and other sociodemographic factors on the nutritional status of children living in urban communities in the interior of Maranhão, aiming to describe aspects of the nutritional transition in a context where a large proportion of the population depends on cash transfer programs for their food security

METHODS

Setting. The study was conducted in the municipality of Barra do Corda (5°30'21"S, 45°14'34"W), located in the state of Maranhão. With a population of 88,900, Barra do Corda lies 462 km from the capital, São Luís, at the confluence of the Corda and Mearim rivers. The municipality has a medium Human Development Index (0.606), a tropical hot and humid climate, and is situated in an ecotone between the Cerrado and Amazon biomes.

Study Design, Sampling, and Recruitment Strategy. A cross-sectional study was conducted including 509 children aged 1 to 12 years-old in Barra do Corda, most of whom (n = 425) were recruited from the Primary Health Care Unit Councilman Aldo Andrade, which provides first contact with the Unified Health System (SUS, Portuguese acronym) for 03 districts in Barra do Corda (Nossa Senhora das Dores; Altamira/Cohab; Altamira/Calvário). Considering that 2,165 children attend this Primary Health Care Unit—for vaccination, childcare and consultations—the sample was calculated using the following parameters: an expected prevalence of obesity/malnutrition of 50%, a 5% margin of error, and a 99% confidence level. A questionnaire was administered to collect sociodemographic data. The sampling, although random at the Primary Health Care Unit—where it was conducted in the context of the Bolsa Família Program's weighing—also included, in a second random sampling arm, the evaluation of children from a private school, who were predominantly not beneficiaries of income transfer programs (n = 84). This two-site sampling was carried out to allow the assessment of children from different income strata.

Anthropometry. Children's weight was measured using calibrated and certified digital scales, accurate to 100 g for children over 12 months of age and 10 g for infants aged 12 months or younger. Height was measured using a vertical stadiometer or a horizontal infantometer (for babies), accurate to 1 mm. All measurements were taken by nursery students trained in anthropometry. Using the date of birth from each child's health record, z- (BMIZ). These calculations were performed using the WHO Anthroplus software¹⁸, based on the World Health scores were calculated for height-for-age (HAZ), weight-for-age (WAZ),

and body mass index-for-age Organization (WHO) growth standards. Stunting was defined as HAZ < -2, underweight as WAZ < -2, and wasting as BMIZ < -2. For children under 5 years of age (0 to 59 months), overweight and obesity were defined as a BMI-for-age Z-score (BMI-Z) between +2 and +3, and greater than +3, respectively. For children aged 5 years and older (60 months or more), overweight was defined as a BMI-Z between +1 and +2, and obesity as a BMI-Z greater than +2.

Statistical Analyses. The frequencies of stunting, underweight, wasting, overweight, and obesity were described. Stunting and overweight/obesity (combined) were treated as dependent variables, and their associations with the independent variables—sex, household income, number of children in the family, attendance at a private school, home ownership, and maternal education level—were assessed using prevalence ratios (PRs) with corresponding 95% confidence intervals (CIs). Statistical significance of these associations was evaluated using Fisher's exact test, with a significance threshold of $p < 0.05$. The means of HAZ, WAZ, and BMIZ scores, considered continuous dependent variables, were compared across groups defined by the same set of independent variables using Student's *t*-test, with significance also set at $p < 0.05$

RESULTS

The frequencies of specific nutritional conditions were as follows: stunting (12%), underweight (4.1%), wasting (1.8%), overweight (14.1%), and obesity (4.9%). Among the 61 children identified as stunted, 2 (3.3%) were obese, 4 (6.6%) were overweight, 2 (3.3%) were also classified as wasted, and 14 (23%) were underweight. Figures 1A and 1B are a diagram showing the distribution of the children studied in relation to the HAZ, WAZ and BMIZ variables, illustrating the presence of stunted children across different BMIZ and WAZ ranges.

As shown in Table 1, the prevalence of stunting was significantly higher among children whose mothers had lower levels of education. There was also a noticeable trend toward lower stunting prevalence among children attending private schools. Conversely, the prevalence of overweight/obesity was significantly lower among children whose mothers had lower educational attainment and among those whose families were not enrolled in the Bolsa Família program, indicating better income conditions.

Regarding the anthropometric z-scores, HAZ was significantly lower among children who did not attend private school, whose mothers had lower educational levels, who lived in households without home ownership, and whose families relied exclusively on government cash transfer programs (Table 2). WAZ was also significantly lower among children not attending private school, with low maternal education, and from families dependent solely on Bolsa Família. The BMI-for-age z-score (BMIZ) was negatively associated with not attending a private school, being female, having a mother with low educational attainment, household dependence on Bolsa Família as the only source of income, and lack of home ownership (Table 2).

DISCUSSION

In the urban area studied in the state of Maranhão, nutritional transition among children was characterized by a higher prevalence of overweight and obesity compared to underweight and wasting. The present investigation also identified the coexistence, at the community level, of stunting and overweight/obesity, reinforcing findings from the literature across different geographic contexts.

Studies conducted in Mexico have shown that this double burden of malnutrition particularly affects children from households with lower socioeconomic status, even within already impoverished populations¹⁹. Similarly, research conducted in Indonesia reinforces that the double burden of malnutrition significantly affects preschool-aged children. Considering this

scenario, it becomes essential for public policies to address both chronic undernutrition and overweight simultaneously, in an integrated and context-specific manner²⁰.

Although limitations in the stratified sampling process by social level require caution when extrapolating the identified frequencies of the different nutritional diagnoses to the city, it was possible to compare groups from different socioeconomic contexts in Barra do Corda. Data from the present study suggest that stunting manifest in two distinct contexts: it is associated with excess weight among children from relatively better-off households and with protein-energy malnutrition among those from poorer families. Despite stunting was observed in both social strata identified in the study it was significantly more frequent among children whose mothers had lower educational levels. The analysis of body mass index and weight-for-age among stunted children revealed cases of obesity, overweight, underweight, and even wasting. Stunting associated with protein-energy malnutrition affected only children from the lower social stratum, receiving income supplementation through government programs. This duality indicates that stunting may be a common result of different nutritional risks within the same population. The findings suggest that although obesity and overweight — conditions associated with greater food availability — are the most frequently observed nutritional diagnoses in Barra do Corda, there are families in which stunting clearly represents chronic undernutrition and who appear to be experiencing food insecurity and a strong dependence on income supplementation programs aimed at purchasing food. In the total set of children, including those not stunted, the mean HAZ values were significantly and negatively influenced by lower social conditions. Data revealed that children from the most socioeconomically disadvantaged families were significantly shorter, and therefore with a higher likelihood of reaching the HAZ threshold that defines stunting.

The concept of stunting was proposed by Waterlow in 1972²¹, when he introduced a classification of protein-energy malnutrition that considered the child's height. In this context, stunting is understood as the result of a decreased linear growth rate, reflecting the duration of nutritional deprivation and indicating chronic malnutrition. In Brazil, stunting is the most common form of malnutrition, with a stable prevalence that ranged from 14.3% in 2014 to 14.5% in 2022²², according to the Interministerial Chamber for Food and Nutrition Security. The paradoxical association, well established in the literature, between stunting and overweight/obesity has been the subject of investigation regarding its pathophysiology. It has been demonstrated that childhood nutritional stunting is associated with impaired fat oxidation, as assessed through respiratory quotient measurements and substrate oxidation evaluated by indirect calorimetry²³. In addition, epigenetic mechanisms and the gut microbiota are factors potentially involved in reduced fat oxidation. Studies have shown that individuals who experienced undernutrition in utero exhibit altered expression of specific candidate genes—*pdx1*, *glut4*, *nr3c1*, and *pomc*—which contribute to increased feeding behavior and insulin resistance. Additionally, stunted individuals tend to have a lower abundance of species from the *Bacteroidetes* phylum in their gut microbiota, leading to reduced expression of factors involved in fat oxidation²⁴. These mechanisms may underlie the proposed “thrifty phenotype” hypothesis, in which nutritional deficits occurring early in life lead to a tendency toward lower metabolic rates, insulin resistance, and, consequently, excess adiposity later in life²⁵. Our data indicate that, among the group of children benefiting from the Bolsa Família Program, in Barra do Corda stunting can be seen in a specific context within the nutritional transition. This denotes food insecurity and dependence on income transfer programs, bringing complexity to the context of nutritional diagnoses that place stunting within the framework of the nutritional transition and paradoxically associated with greater adiposity, whether at the individual level or at the community level.

A study conducted in northeastern Brazil found that while the prevalence of undernutrition has been decreasing, the prevalence of overweight has been increasing at an alarming rate. The authors reported a significant reduction in the prevalence of stunting during the study period. At the same time, there was a substantial increase in the prevalence of overweight, leading to the conclusion that stunting has become a less significant problem when compared to overweight²⁶.

The trend of reduction in child stunting was also evidenced by records from the Food and Nutrition Surveillance System (SISVAN, Portuguese acronym), with emphasis on the states of the Northern Region. In this context, public policies aimed at expanding access to primary health care and the school feeding program appear to have played a relevant role in improving child anthropometric indicators.²⁷ Between 2008 and 2017, there was a marked decline in the prevalence of child stunting, especially in three states and, in aggregate, across the entire Northern Region. Additionally, the expansion of system coverage showed a significant association with the reduction of this condition in four states. These findings suggest that the combination of structural interventions in the health care network and food security programs may have synergistically contributed to the decrease in child stunting rates in the region.

Nevertheless, growth deficits remain a significant public health issue in Brazil, with strong social determinants such as low maternal education, poverty, and lack of household infrastructure. International studies indicate that even among low-income populations, there are marked differences in nutritional indicators based on ethnic and territorial variables. In Guatemala, for example, indigenous and rural children show much poorer growth indicators compared to non-indigenous children, reinforcing the role of structural inequality²⁸. Over the past two decades, chronic intestinal parasitic infections—such as giardiasis and soil-transmitted helminthiasis, which remains highly prevalent in areas lacking adequate sanitation—have been shown to be important determinants of protein-energy malnutrition, particularly stunting²⁹.

Regarding low weight-for-height (low BMIZ or wasting), it was observed in a small proportion of children, all of whom belonged to the lowest socioeconomic stratum. However, mean BMIZ values were significantly lower among the poorest children, further supporting the interpretation that minimum income cash transfer programs play a critical role in ensuring food security within this group. A similar interpretation applies to the WAZ parameter, which was significantly positively associated with attending a private school and with household ownership, and negatively associated with the absence of wage income and exclusive reliance on resources from the Bolsa Família program. The combined analysis of these two indicators indicates that children dependent on the Bolsa Família Program are not only shorter, but also significantly thinner and lighter—once again suggesting that the nutritional transition in the study area is shaped by the dependence of many families on financial assistance to afford food³⁰.

The results obtained in this study show significantly higher BMI-for-age z-scores (BAZ) in boys and a higher prevalence of overweight/obesity in this population, although without statistical significance — findings that are consistently supported by the national literature. The systematic review and meta-analysis conducted by Ferreira et al.³¹ Confirms this pattern in a comprehensive national sample, estimating an obesity prevalence of 9.7% (95% CI: 9.4–9.9) among boys and 7.3% (95% CI: 7.1–7.5) among girls. This finding suggests that this difference is not limited to regional samples or specific periods, but rather constitutes a persistent and representative phenomenon in Brazil. The convergence between population-based surveys and analyses with greater methodological robustness reinforces the credibility of this observation and points to a trend that warrants further

investigation. Possible hypotheses raised by the international literature include sociocultural aspects, such as differences in intra-household dietary patterns — with a possible prioritization of boys in access to higher energy density foods —, distinct patterns of physical activity and sedentary behavior, and greater exposure to advertising and consumption of ultra-processed foods³².

CONCLUSION

It is concluded that the double burden of malnutrition—typically described as the coexistence of stunting and overweight/obesity in a context of increased food availability—coexists with the risk of undernutrition and relative food insecurity among families dependent on cash transfer programs aimed at food acquisition, within a broader context of social inequality.

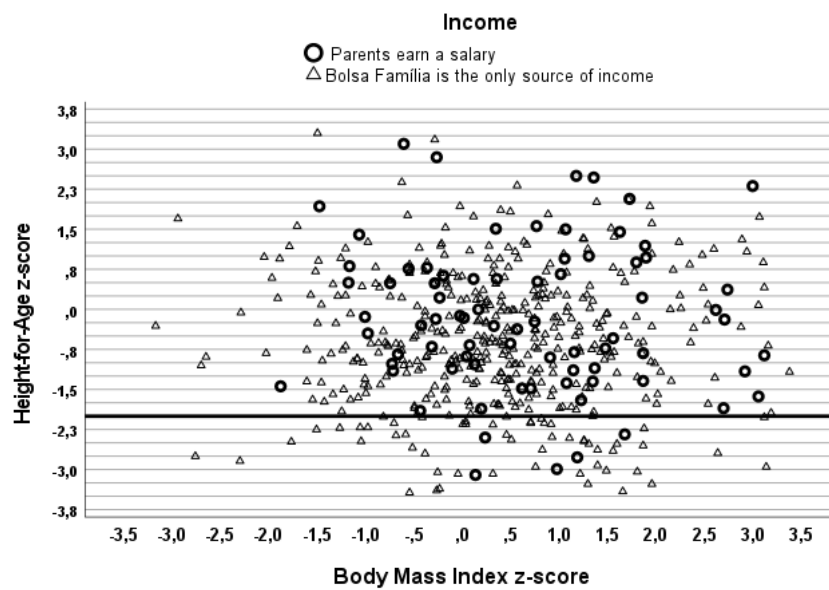
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Figure 1. Distribution of height-for-age and BMI-for-age z-scores according to household income in children from Barra do Corda, Maranhão, 2025



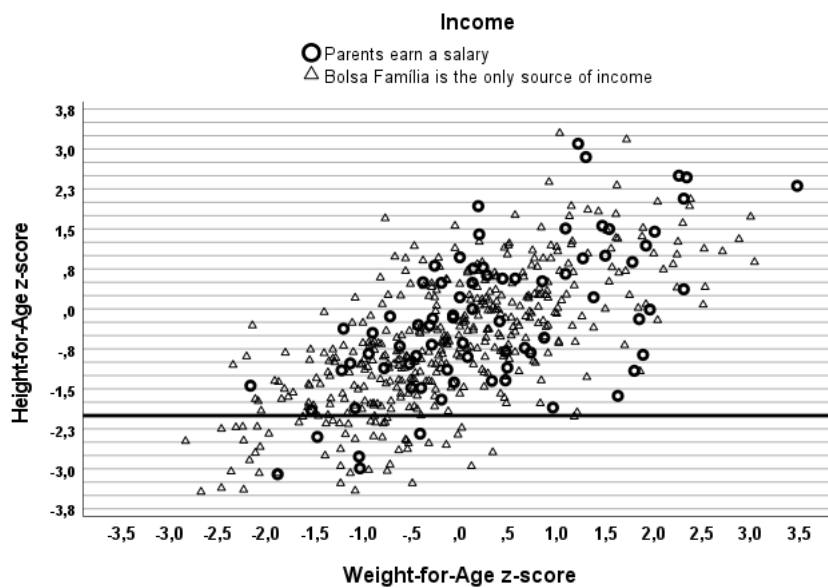
Horizontal axis (Body Mass Index z-score): Represents the BMI-for-age z-score, used to classify underweight, normal weight, overweight, and obesity.

Vertical axis (Height-for-Age z-score): Represents the height-for-age z-score, used to identify children with adequate growth or stunting.

Circles (●): Children whose parents receive a salary.

Triangles (△): Children whose only source of income is the Bolsa Família program.

Figure 2. Distribution of height-for-age and weight-for-age z-scores according to household income in children from Barra do Corda, Maranhão



Horizontal axis (Weight-for-Age z-score): Represents the weight-for-age z-score, an indicator of nutritional status in relation to body weight.
 Vertical axis (Height-for-Age z-score): Represents the height-for-age z-score, used to identify stunting.
 Circles (●): Children whose parents receive a salary.
 Triangles (△): Children whose only source of income is the Bolsa Família program.

Table 1. Prevalence and sociodemographic factors associated with stunting and overweight/obesity among children in Barra do Corda, 2025.

	Stunting			Overweight / Obesity		
	Frequency ^a	PR ^b (95% CI)	p-value ^c	Frequency ^a	PR ^b (95% CI)	p-value ^c
Private school						
Yes	5/84 (6%)	1		17/84 (20.2%)	1	
No	56/425 (13.2%)	2.21 (0.91 – 5.36)	0.066	55/425 (12.9%)	0.63 (0.39 – 1.04)	0.087
Sex						
Male	30/246 (12.2%)	1.03 (0.64 – 1.65)	0.892	39/246 (15.9%)	1.26 (0.82 – 1.94)	0.309
Female	31/263 (11.8%)	1		33/263 (12.5%)	1	
Mother education						
Elementary,	28/164 (17.1%)	1.95 (1.22 – 3.12)	0.007	12/164 (7.3%)	0.42 (0.23 – 0.76)	0.003
High school	33/345 (9.6%)	1		60/345 (17.4%)	1	
Number of sons						
≤ 3	59/474 (12.4%)	1		70/474 (14.8%)	1	
≥ 4	2/35 (5.7%)	0.42 (0.09 – 1.82)	0.414	2/35 (5.7%)	0.34 (0.08 -1.49)	0.205
Income						
Bolsa Família only	56/431 (13%)	2.00 (0.82 - 4.83)	0.128	55/431 (12.8%)	0.58 (0,28 – 0.96)	0.050
One minimum wage or more	5/78 (6.4%)	1		17/78 (21.8%)	1	
Own house						
Yes	27/252 (10.7%)	1		41/252 (16.3%)	1	
No	34 / 257 (13.2%)	1.23 (0.76 – 1.98)	0.414	31/257 (12.1%)	1.34 (0.87 – 2.07)	0.203

^a**Frequency:** Absolute and percentage frequency of the condition (Stunting or Overweight/Obesity) in each category.

^b**PR (95% CI):** Prevalence Ratio with 95% Confidence Interval, comparing the risk of the condition between groups.

^c**p-value:** P-value indicating statistical significance.

p < 0.05: Statistically significant difference.

p ≥ 0.05: Non-significant difference.

Table 2. Comparison of mean z-scores of anthropometric parameters among children in Barra do Corda, 2025, across groups defined by sociodemographic characteristics.

	HAZ		WAZ		IMCZ	
	Mean ± SD		Mean ± SD		Mean ± SD	
Private school						
No	-,59619	1,250004	-,09221	1,080122	,36191	1,141588
Yes	-,19524	1,250051	,35464	1,194011	,70274	1,243292
	P=0,007		P=0.001		P=0,014	
Sex						
Male	-,53589	1,210173	,05000	1,083673	,56703	1,146257
Female	-,52452	1,302749	-,08251	1,134224	,27891	1,166575
	P=0,919		P=0.179		P=0.005	
Mother education						
High school	-,42484	1,264031	,11441	1,132132	,52049	1,200369
Elementary,	-,75128	1,218463	-,29799	1,012750	,20288	1,057068
	P=,006		P=,000		P=,004	
Number of sons						
≤ 3	-,52492	1,278087	,00424	1,117494	,44288	1,184311
≥ 4	-,59914	,949450	-,32600	,981695	,08343	,792902
	P=,737		P=,090		P=,078	
Income						
Bolsa Família only	-,13115	1,387905	,37103	1,188273	,69103	1,198806
One minimum wage or more	-,60220	1,220464	-,08896	1,082957	,36878	1,152848
	P=,002		P=,001		P=,024	
Own house						
Yes	-,39667	1,294250	,12262	1,109428	,49635	1,164391
No	-,66078	1,208946	-,15681	1,097097	,34149	1,161987
	P=,018		P=,134		P=,004	

^a**Frequency:** Absolute and percentage frequency of the condition (Stunting or Overweight/Obesity) in each category.

^b**PR (95% CI):** Prevalence Ratio with 95% Confidence Interval, comparing the risk of the condition between groups.

^c**p-value:** P-value indicating statistical significance.

p < 0.05: Statistically significant difference.

p ≥ 0.05: Non-significant difference.

Declaração de contribuição dos autores

Author Contributions

Iniciais do Autor 1 (ex: F.S.S): Conceituação, Administração do projeto, Supervisão, Metodologia, Escrita, Rascunho original, Edição.

Iniciais do Autor 2 (ex: T.M.P.L): Supervisão, Conceituação, Rascunho original.

Iniciais do Autor 3 (ex: A.L.A): Conceituação, Metodologia, Recursos.

Iniciais do Autor 4 (ex: A.K.S.S): Conceituação, Metodologia, Recursos.

Iniciais do Autor 5 (ex: A.C.S.S): Conceituação, Metodologia, Recursos.

Iniciais do Autor 6 (ex: J.M.F.P): Conceituação, Metodologia, Recursos.

Iniciais do Autor 7 (ex: K.S.P): Conceituação, Metodologia, Recursos.

Iniciais do Autor 8 (ex: M.E.S.T): Supervisão, Conceituação, Metodologia, Recursos

Iniciais do Autor 9 (ex: R.R.S): Conceituação, Metodologia, Recursos.

Iniciais do Autor 10 (ex: R.S.V): Conceituação, Metodologia, Recursos.

Iniciais do Autor 11 (ex: W.A.L): Conceituação, Metodologia, Recursos, Vizualização.

Iniciais do Autor 12 (ex: F.A.C.S): Conceituação, Metodologia, Administração do projeto, Escrita, revisão.

Declaração de conflito de interesse

Os autores declaram que não há conflito de interesse.

Declaração de disponibilidade de dados da pesquisa

Todo o conjunto de dados de apoio aos resultados deste estudo foi publicado no próprio artigo.

Declaração de Aprovação do Comitê de Ética

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Estado nutricional de crianças no município de Barra do Corda, estado do Maranhão: transição nutricional e desafios para a Agenda 2030

Pesquisador: FELIPE SANTANA E SILVA

Área Temática:

Versão: 2

CAAE: 80557324.0.0000.5554

Instituição Proponente: UNIDADE DE ENSINO SUPERIOR DO CENTRO MARANHENSE LTDA

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 7.045.728

Apresentação do Projeto:

O projeto de pesquisa cujo título ESTADO NUTRICIONAL DE CRIANÇAS NO MUNICÍPIO DE BARRA DO CORDA, ESTADO DO MARANHÃO: transição nutricional e desafios para a Agenda 2030, nº de CAAE 80557324.0.0000.5554 e Pesquisador(a) responsável FELIPE SANTANA E SILVA. Trata-se de um estudo transversal e abordagem quantitativa dos dados.

O cenário da realização desse estudo será composto por o município de Barra do Corda, no estado do Maranhão.

Os participantes desta pesquisa serão crianças com idade até 14 anos atendidas na atenção primária à saúde do município.

Os critérios de inclusão da pesquisa são: crianças com idade até 14 anos atendidas na atenção primária à saúde do município, matriculadas nas Unidades Básicas de Saúde Ângela Maria do Nascimento Tamarindo, Dr. José de Abreu Silva, Manoel Inácio, N. S. Aparecida Araticum, Santa Maria Trezidela, Vereador Aldo Andrade, Vila Alvorada e Vila Nenzi.

Para tanto, as informações desta pesquisa serão coletadas submetendo a criança a aferição de seu peso, sua altura e sua circunferência braquial e responder a um curto questionário quantitativo de questões objetivas sobre dados referentes ao aleitamento materno e desmame e dados demográficos. A Análise de Dados será realizada por análises estatísticas univariadas.

Os critérios de inclusão serão crianças com idade de 0 à 14 anos, residentes nas comunidades específicas e selecionadas para o estudo, atendidas na atenção primária à saúde do município, matriculadas nas Unidades Básicas de Saúde Ângela Maria do Nascimento Tamarindo, Dr. Jose de Abreu Silva, Manoel Inacio, NS Aparecida Araticum,

Santa Maria Trezidela, Vereador Aldo Andrade, Vila Alvorada e Vila Nenzin, que recebam algum tipo de benéfico e/ou bolsa do governo, que tenham informações disponíveis sobre a prática de aleitamento materno, incluindo duração do aleitamento exclusivo e idade do desmame e as quais tenham assinado o Termo de Consentimento Livre e Esclarecido (TCLE) e o Termo de Assentimento Livre e Esclarecido (TALE). Os critérios de exclusão será crianças que tenha algum tipo de doença crônica ou condições congênitas que afetam o crescimento e desenvolvimento (ex: síndrome de Down, distúrbios metabólicos); crianças que passaram por hospitalizações prolongadas (mais de 30 dias) nos últimos 6 meses; crianças que estejam recebendo tratamento nutricionais específicos, como alimentação parenteral ou suplementos alimentares prescritos por médicos, além daquelas os TCLE e TALE não tenham sido assinados.

Objetivo da Pesquisa:

Objetivo Geral

Realizar um diagnóstico global do status nutricional das crianças que vivem em comunidades vulneráveis, no município de Barra do Corda, no Maranhão, descrevendo o cenário local de transição nutricional.

Objetivos Específicos:

Estimar a prevalência e descrever os fatores associados à desnutrição crônica caracterizada por valores de AIZ inferiores a -2, identificando também os fatores demográficos capazes de influenciar este parâmetro nutricional;

Estimar a prevalência e descrever os fatores associados à desnutrição aguda caracterizada por valores de PAZ inferiores a -2, identificando também os fatores demográficos capazes de influenciar este parâmetro nutricional;

Estimar a prevalência de descrever os fatores associados ao baixo peso caracterizado por valores de PIZ inferiores a -2, identificando também os fatores demográficos capazes de influenciar este parâmetro nutricional;

Estimar a prevalência e fatores associados à obesidade caracterizada por valores de PIZ, PAZ e IMCZ superiores a +2;

Estimar a prevalência de desmame precoce em crianças nas comunidades estudadas;

Descrever padrões locais de aleitamento exclusivo, incluindo características como sua duração e alimentos introduzidos para o desmame

Avaliação dos Riscos e Benefícios:

Os Riscos apresentados no texto são adequados e constam tanto No projeto, quanto no TALE E TCLE: Ressalta-se que para garantir a total privacidade dos sujeitos da pesquisa, será atribuído o uso de siglas seguidas de uma numeração cardinal, para identificação dos mesmos no decorrer da apresentação dos resultados do estudo. Existem alguns riscos aos quais os participantes estarão expostos como o fato de eventualmente poder da balança quando for aferir seu peso, e/ou bater a cabeça no antropômetro. Para evitar que isso aconteça, a aferição destes dados será realiza por três pessoas treinadas, onde uma irá

anotar os dados e as outras duas irão fornecer suporte, ou seja, ficar ao seu lado e prestar as devidas orientações para evitar que esse incidente aconteça. Além disso, o participante irá contar com a assistência do responsável para se sentir mais seguro no momento da coleta de dados.

Os benefícios do estudo constam na Metodologia e TALE: não oferece nenhum benefício imediato ao pesquisado. Porém, os dados encontrados poderão contribuir para uma melhor avaliação dos programas de renda em comunidades com alta prevalência de pobreza e pobreza extrema. Além de fornecer uma visão geral do estado nutricional destas crianças, para que assim estratégias sejam criadas para minimizar essa incidência.

Comentários e Considerações sobre a Pesquisa:

A pesquisa é relevante, apresenta interesse público e o(a) pesquisador(a) responsável tem experiências adequadas para a realização do projeto, como atestado pelo currículo Lattes apresentado. A metodologia é consistente e descreve os procedimentos para realização da coleta e análise dos dados. O protocolo de pesquisa não apresenta conflitos éticos estabelecidos na Resolução nº 466/12 do Conselho Nacional de Saúde.

Considerações sobre os Termos de apresentação obrigatória:

Os Termos de Apresentação obrigatória tais como TALE, TCLE, Ofício de encaminhamento ao CEP, Declaração dos pesquisadores e outros estão presentes e adequados.

Recomendações:

Evidenciar melhor os benefícios da pesquisa, já que podem ser diretos ou indiretos para os participantes da pesquisa ou para outras pessoas em situações semelhantes, para a ciência, o desenvolvimento científico, para os pesquisadores e/ou para a sociedade em geral.

Conclusões ou Pendências e Lista de Inadequações:

O projeto está **APROVADO** e pronto para iniciar a coleta de dados e as demais etapas referentes ao mesmo.

Considerações Finais a critério do CEP:

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_P ROJETO_2338632.pdf	17/07/2024 21:46:29		Aceito
Outros	TCUD.pdf	17/07/2024 21:37:51	FELIPE SANTANA E SILVA	Aceito
Outros	ENCAMINHAMENTO.pdf	17/07/2024 21:36:46	FELIPE SANTANA E SILVA	Aceito
Cronograma	CRONOGRAMA.pdf	17/07/2024 21:35:06	FELIPE SANTANA E SILVA	Aceito

Declaração de Pesquisadores	Pesquisadores.pdf	17/07/2024 21:33:05	FELIPE SANTANA E SILVA	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TALE.pdf	17/07/2024 21:31:13	FELIPE SANTANA E SILVA	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	tcle.pdf	17/07/2024 21:30:33	FELIPE SANTANA E SILVA	Aceito
Declaração de Instituição e Infraestrutura	INSTITUCIONAL.pdf	17/07/2024 21:29:41	FELIPE SANTANA E SILVA	Aceito
Projeto Detalhado / Brochura Investigador	Projeto.pdf	17/07/2024 21:28:20	FELIPE SANTANA E SILVA	Aceito
Outros	INSTRUMENTO.pdf	17/07/2024 21:18:12	FELIPE SANTANA E SILVA	Aceito
Outros	CLFA.pdf	17/07/2024 21:16:21	FELIPE SANTANA E SILVA	Aceito
Outros	CLF.pdf	17/07/2024 21:13:15	FELIPE SANTANA E SILVA	Aceito
Folha de Rosto	Folha.pdf	07/05/2024 22:09:13	FELIPE SANTANA E SILVA	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

CAXIAS, 01 de Setembro de 2024

FRANCIDALMA SOARES SOUSA CARVALHO FILHA

(Coordenador(a))

This preprint was submitted under the following conditions:

- The authors declare that the necessary Terms of Free and Informed Consent of participants or patients in the research were obtained and are described in the manuscript, when applicable.
- The authors declare that the preparation of the manuscript followed the ethical norms of scientific communication.
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