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Association of parental level of education and child factors on length-for-age indicator among socially vulnerable children aged 6-24 months from a Brazilian state using Structural Equation Modelling

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ABSTRACT

This cross-sectional study employs Structural Equation Modelling (SEM) to explore both direct and indirect effects of parental level of education and child individual factors on the length-for-age outcomes in children aged 6-24 months assisted by the Bolsa Família Program in the State of Alagoas. A total of 1,448 children were analyzed by the SEM technique. A negative standardize direct effect (SED) of the children's younger age (SED: -0.06; p=0.017), the use of bottle feeding (SED: -0.11; p<0.001), and lack a minimum acceptable diet (SED: -0.09; p<0.001) on the length-for-age indicator was found. Being female (SDE: 0.08; p=0.001), the higher birth weight (SDE: 0.33; p<0.001), being ever breastfed (SED: 0.07; p=0.004) and a higher level of parental education (SDE: 0.09; p<0.001) showed a positive SDE effect on the child's length-for-age. The model also demonstrated a negative standardize indirect effect (SIE) of the sweet beverage consumption (SIE: -0.08; p=0.003) and a positive effect of being ever breastfed (SIE: 0.06; p=0.017) on the child's length-for-age through parental level of education as a mediator. This research underscores the crucial role of proper feeding practices and provide valuable insights for the development of targeted interventions, policies, and programs to improve the nutritional well-being and promote adequate linear growth and development among young children facing similar challenges.

Keywords: Stunting, Child nutrition, Complementary feeding, Poverty

INTRODUCTION

Low length-for-age, or stunting, is an undernutrition condition marked by linear growth faltering due to inadequate nutrition in utero and early childhood, affecting more than 148 million children under 5 worldwide[1]. It is associated with a greater risk of weight excess and non-communicable diseases later in life, as well as irreversible physical and brain damage with long-term impacts[2]. Stunted children may reach adulthood with short stature and may never achieve their full cognitive potential, resulting in learning difficulties in school and reduced lifetime income, a drawback that can even propagate to the next generation[3,4].

This health condition can be seen as a synonym for social disadvantage, where children facing social, economic, political, and emotional challenges are shorter than those in more favorable environments[5]. The Brazilian Conditional Cash Transfer Program, Bolsa Família, represents an important strategy to alleviate socioeconomic disparities and improve the living conditions of families in situations of poverty and extreme poverty [6]. In the State of Alagoas, the Brazilian state with the lowest Human Development Index (HDI)[7] and where the program plays a crucial role in supporting households, it is essential to explore the conditions influencing child health in this specific context.

The WHO framework on the Context, Causes, and Consequences of Childhood Stunting, published in 2013[8], outlines a set of factors associated with stunting, examined at a global level. However, it is extremely useful to investigate how these factors manifest among young children living in poverty in one of the poorest Brazilian states. This investigation can provide crucial insights to support policymakers in decision-making within the realm of public policies for health and nutrition in the country.

The Structural Equation Modelling (SEM) is a multivariate technique used to investigate the complex relationships among variables through the combination of elements of factor analysis and regression analysis, testing the direct, indirect and total effects on pre-assumed relationships[9,10].

Thus, this study was conducted to utilize SEM in exploring the direct and indirect effects of parental level of education and child individual factors on the length-for-age outcomes among children aged 6-24 months assisted by the Bolsa Família Program in the State of Alagoas.

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METHODS

Design

This cross-sectional study is part of a project entitled '*Evaluation of the Management and Operation of the National Program for Iron and Vitamin A Supplementation and their Relationship with the Nutritional Status of Children Aged 6–24 Months in Municipalities of Alagoas State*'. This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Ethics Committee in Research of Alagoas Federal University (process No. 80416617.0.0000.5013). Written informed consent was obtained from the legal guardians of all subjects. The STrengthening the Reporting of OBservational studies in Epidemiology – Nutritional Epidemiology (STROBE-nut) checklist for cross-sectional studies was adopted for structuring the study[11].

Setting and sample selection

Information on the study region and participant recruitment are described in detail elsewhere[12-14]. Briefly, children aged 6–24 months, assisted by the Bolsa Família Program, and residents of six municipalities in the State of Alagoas, located in the northeast region of Brazil, were eligible for enrolment. The flow diagram for selection of study participants is reported in Figure 1.

Data collection

Data were collected between May and December 2018 by trained staff comprising 4 nutritionists and 10 technical assistants. The children's parents were interviewed using a structured questionnaire about their sociodemographic issues and the children's nutritional status.

Outcome variable

The outcome variable was the length-for-age indicator (continuous). Subsequently, this indicator was classified as stunting when length-for-age < -2Z score[15], analyzed using the WHO's Anthro Survey Analyzer software, version 3.2.2[16]. Length was measured in a recumbent position using the Alturexata® portable infantometer (Alturexata Ltd) placed on a flat and stable surface. The children were measured with no clothes, shoes, socks or hair ornaments, and their parents were requested to hold the children's head while the researcher held the knees and took the measurement[17].

Exogenous and endogenous variables

The selection of parental and infant variables for the SEM was based on previous publications on early-life determinants of childhood stunting[18-21]. The following variables were investigated: the parental level of education, children's characteristics (including age, sex and birth weight) and complementary feeding indicators (including Ever breastfed, Bottle feeding 0–23 months, Sweet beverage consumption 6–23 months, and Minimum acceptable diet 6–23 months).

Children's birth weight was collected from the Child Health Handbook and later classified as low weight (<2,500 g), normal (≥2,500 g and <4000 g), or high (≥4,000 g)[22].

Children's complementary feeding was assessed using the questionnaire proposed by Oliveira et al.[23], adapted for regional foods and based on the WHO Indicators for assessing infant and young child feeding practices (IYCF)[24]. The questionnaire was composed by pre-established questions about the child's food consumption in the last 24 hours before the interview. Noteworthy, posteriorly, the complementary feeding data was updated to the new revised IYCF indicators published in 2021 by the WHO and UNICEF[25]. The indicator of ever breastfed was calculated using the proportion of children born in the last 24 months who were ever breastfed. The bottle feeding indicator was obtained by the percentage of children 6–23 months of age who were fed from a bottle with a nipple during the previous day. Sweet beverage consumption was calculated through the proportion of children 6–23 months of age who consumed a sweet beverage during the previous day. Finally, the indicator of minimum acceptable diet was constructed based on specific criteria for breastfed and non-breastfed children. For breastfed children, minimum acceptable diet was defined as meeting both minimum dietary diversity and minimum meal frequency requirements within the previous 24 hours. Minimum dietary diversity refers to the consumption of foods and beverages from at least five out of eight defined food groups (breast milk; grains, roots, tubers and plantains; pulses, nuts and seeds; dairy products; flesh foods; eggs; vitamin-A rich fruits and vegetables; and other fruits and vegetables). Minimum meal frequency entails consuming solid, semi-solid, or soft foods, along with milk feeds, at least the minimum number of times for their age during the previous day. Similarly, for non-breastfed children, minimum acceptable diet was defined based on meeting minimum dietary diversity and minimum meal frequency requirements within the previous day, along with at least two milk feeds[25].

Statistical Analysis

Data were tabulated by double-independent typing and analyzed using the R software (version 4.3.2; R Core Team, R Foundation for Statistical Computing, Vienna, Austria). The variables were described in absolute and relative frequencies. Initially, the exogenous and endogenous variables were compared according to the presence of stunting using either Pearson's chi-square test (χ^2) or Fisher's exact test, as appropriate.

For the SEM the lavaan 0.6–16 package was used. For this analyze, cases with missing data cannot be included (Figure 1). The conceptual path diagram used to address the hypothesis that poor level of parental education and child factors have effects on length-for-age indicator was generated from a set of variables based on previous research[18-21], using causal assumptions. The model applied in SEM was built using directed acyclic graph (DAG) through DAGitty 3.1 (available at www.dagitty.net)[26]. The model parameters were estimated using the maximum-likelihood (ML) technique, given the variables are normally distributed, the large sample size and as the endogenous variable is continuous. Nevertheless, we integrated modifications that align with theoretical plausibility and avoided introducing unnecessary complexity to the model. Direct (SDE) and Indirect effects (SIE) were presented as standardized coefficients from simultaneous linear regressions. The model fit was analyzed using the following indices: Chi-square test, Chi-square/Degrees of freedom ratio, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker–Lewis index (TLI). Concerning these indices, it is expected that there will be no difference between the implied and observed matrices, as indicated by absolute fit criteria, and foresees a strong correlation among the examined variables, as suggested by relative fit criteria[10].

RESULTS

A total of 1,448 children were analyzed by the SEM technique. Among them, 9.3% were stunted, with 60.7% of these being male, and 48.9% of their parents had less than 9 years of education. The sample has a homogeneous distribution of sex and age. Regarding to food intake, 93% of the children were ever breastfed, and nearly 68% had a minimum acceptable diet. In contrast, almost 33% of the children had consumed sweet beverages (Table 1).

The path diagram of the structural equation model is showing in Figure 2. The values shown over the solid arrows indicate the statistically significant SDE and SIE. The model had a good fit according to the recommended indexes and its acceptable cutoffs (Table 2). When analyzing the SDE, we found a negative effect of the children's younger age (SED: -0.06; 95%CI: -0.025; -0.002), the use of bottle feeding (SED: -0.11; 95%CI: -0.407; -0.157), and do not have a minimum acceptable diet (SED: -0.09; 95%CI: -0.350; -0.102) on the length-for-age indicator. On the other hand, being female (SDE: 0.08; 95%CI: -0.075; 0.300), the higher birth weight (SDE: 0.33; 95%CI:0.618; 0.826), being ever breastfed (SED: 0.07; 95%CI: 0.105; 0.552) and a higher level of parental education (SDE: 0.09; 95%CI: 0.015; 0.047) showed a positive effect on the child's length-for-age (Figure 2, Table 3).

Furthermore, among the SIE, the model also demonstrated a negative effect of the sweet beverage consumption (SIE: -0.08; 95%CI: -0.980; -0.196) and a positive effect of being ever breastfed (SIE: 0.06; 95%CI: 0.155; 1.564) on the child's length-for-age through parental level of education as a mediator (Figure 2, Table 3).

DISCUSSION

This study used SEM analysis to understand the effects of parental level of education and children’s individual factors on the length-for-age indicator in socially vulnerable children under 2 years of age from a Brazilian state. Concerning the theoretical model proposed by this study, all indicators demonstrated to have either a SDE, SIE, or both on the children's length-for-age indicator.

In view of our findings, we highlight the effects of adequate feeding practices on increasing the child's length-for-age. Being ever breastfed was the only factor that exhibited both positive SDE and SIE (mediated by parental level of education) on the child's length-for-age indicator. Coinciding with this discovery, a prior investigation conducted by Campos et al.[27] with children aged 6-35 months revealed evidence supporting a protective impact of any breastfeeding against stunting in comparison to children who were never breastfed. Victora et al.[28] state that breastfeeding offers substantial protection against diarrhea and infections in children, thereby reducing the risk of undernutrition during early life.

It is well known the health benefits of breastfeeding to the infant. Victora et al.[28] suggested that breast milk acts as personalized medicine for babies. Along with this, the authors observed, through The Lives Saved Tool[29], elevating breastfeeding rates to nearly universal levels could potentially save 13.8% the lives of children under 2 years. More recent findings emphasize the crucial role played by the combined nutritive and non-nutritive bioactive components of breast milk, such as hormones, immunological factors, oligosaccharides, and live microbes. These elements, in conjunction with the biological, social, and psychological factors of the mother-child relationship, are fundamental for ensuring proper child growth and development. This unique combination sets breast milk apart, making it unparalleled compared to commercial milk formula[30-32]. Therefore, the WHO[33] recommends exclusive breastfeeding during the first six months of life and continue breastfeeding alongside the introduction of complementary foods until the child reaches ate least 2 years of age.

In contrast, the bottle feeding practice was revealed to have a negative SDE on the child's length-for-age. Similarly, evidence from the literature has found bottle feeding to be a significant predictor of stunting. Jeyakumar et al.[34] and Fekadu et al.[35] identified that children under 2 years of age who were bottle-fed had an increased risk of stunting by 1.5 and 3.8 times, respectively, compared to their counterparts. The use of bottle feeding can exert enduring influences on a child's feeding patterns. Opting for convenience feeding via bottles might hinder the consumption of age-appropriate semisolid and solid foods. This practice also curtails the intake of diversified foods, impacting dietary diversity and contributing to undernutrition. Furthermore, insufficient knowledge about the nutritional adequacy of bottle content and the proper dilution of formulas, may result in nutrient deficits that hinder optimal growth[34].

Additionally, we found that not reaching a minimum acceptable diet has a negative SDE on length-for-age. This aligns with previous research indicating that achieving a minimum acceptable diet is associated with a significant and adverse impact on length-for-age, which suggests that children meeting the minimum acceptable diet indicator are less susceptible to experiencing stunting[36,37]. Achieving a minimum acceptable diet implies that the child has been provided with meals at appropriate frequencies and diversity, ensuring that energy and nutrient requirements are met, which is crucial for proper growth and development. Insufficient meal diversity and frequency place children at risk of malnutrition, particularly stunting and micronutrient deficiencies, and increase susceptibility to morbidity and mortality[25]. According to UNICEF[38], globally, 478 million children under the age of 5 experience food poverty, meaning they lack access to and consumption of a minimum dietary diversity in early childhood. Among them, 202 million children (1 in 3) endure severe food

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poverty, indicating that they are being fed with only 0-2 out of the recommended 8 food groups per day.

In line with Wells et al.[4], the correlation between inadequate energy intake, micronutrient deficiencies, and the intergenerational cycle of undernutrition hampers growth and diminishes the metabolic capacity for homeostasis. Consequently, it leads to a spectrum of adverse health outcomes, including infection, inflammation, gut dysbiosis, cardiometabolic disease, and feto-pelvic disproportion. Furthermore, specific diseases increase susceptibility to various forms of malnutrition. Encountering malnutrition in the critical phase of the early childhood can lead to the depletion of human potential, perpetuating the intergenerational cycle of poverty and undernutrition[3,4].

Although the sweet beverage consumption did not demonstrate a SDE on the child's length-for-age, the observed SIE, mediated by parental level of education, could be associated with increased sugar intake in the diet, leading to disruptions in dietary patterns and nutrient intakes, as the consumption of sugary beverages could displace other foods needed to meet nutrient requirements for optimal growth and nutrition[39]. Jaime et al.[40] drew attention to the elevated prevalence of sugary beverage consumption among Brazilian children under the age of two. The authors demonstrated that sociodemographic characteristics, such as low level of parental education, and family habits influence this inappropriate feeding practice. Besides that, numerous studies have shown a robust association between the consumption of sugar-sweetened beverages and weight gain, which can contribute to childhood malnutrition and has potential metabolic impacts extending into adulthood[41,42].

The above mentioned negative impact of the sweet beverage consumption on child growth could be more pronounced in vulnerable populations, given their already limited access to diverse and nutritious diets, as well as reduced access to healthcare[38]. While the rise in financial support facilitated by the Bolsa Família Program's income transfer provides beneficiaries with better access to food, it doesn't ensure its nutritional quality[13,43]. An unprecedented study published by UNICEF Brazil[44] investigated the knowledge, attitudes, and practices related to nutrition among beneficiaries of the Bolsa Família Program. The findings revealed a concerning prevalence of unhealthy feeding practices, with 72% of children under 2 years old consuming at least one type of ultra-processed food, and 32% consuming sugar-sweetened beverages. The study linked the high consumption of sugary drinks to inadequate breastfeeding practices and early weaning. Additionally, it is crucial to emphasize that sugar-sweetened beverages, as well as foods with added sugar, should not be consumed by children under 2 years old[45].

We also identified that the parental level of education not only mediates the SIE effect of the sweet beverage consumption but also has a SDE on the child´s length-for-age. In line with this, a study conducted in Ethiopia found that maternal education was strongly associated with appropriate complementary feeding practices among children aged 6–23 months, demonstrating that mothers with higher education were almost 3x more likely to practice suitable feeding practices than those with no formal education[46]. In the same vein, Nkurunziza et al.[47] observed that children from a non-educated household head were at a risk of stunting and severe stunting 1.9 and 2.1 times higher, respectively, than those from households headed by an individual with secondary school education and above. Enhanced maternal educational attainment correlates with improved child-care practices in the context of health and nutrition. It is also associated with a decreased likelihood of stunting and an increased capacity to access and derive benefits from health interventions[48,49].

Furthermore, being female and the higher birth weight were linked to a positive SDE, while the child´s younger age to a negative SDE on length-for-age. This aligns with findings in other studies. However, our results deviate from the common pattern observed in most studies, particularly regarding younger age. Unlike the widespread association noted between older age and stunting in the literature[18,50-53], our study reveals a different trend, supported by new evidences. A recent pooled analysis of longitudinal studies in low- and middle-income countries encompassing children aged 0–24 months demonstrated that the most significant onset of stunting occurred between birth and 3 months of age. This pattern was notably prevalent in countries with lower healthcare spending, higher under-5 mortality rates, and increased levels of poverty[53]. In face of these new insights, Victora et al.[54] underscore the importance of directing attention to the initial 1000 days from conception to age 2, providing fresh perspectives on the pivotal significance of maternal nutrition.

Concerning the other aspects, Ali et al.[55] and Thurstans et al.[56] have reported higher odds of stunting among male children than female children (OR 1.99 and OR 1.29, respectively). Although this association is already well established in the literature, the explanations currently offered for these variations are diverse and frequently conjectural, lacking substantial support from direct evidence. Regarding birth weight, Jana et al.[57] reported high odds of stunting in children born with low birth weight (OR 1.46), and Aboagye et al.[58] found a similar association with an odds ratio of 1.68. This can be explained by inadequate prenatal nutrition and restricted fetal growth leading to lower birth weights, which in turn impact postnatal growth. Insufficient nutrient reserves acquired during gestation, combined with increased vulnerability to infections and compromised immunity, hinder a child's optimal growth, contributing to early childhood stunting[3,59].

Moreover, the stunting prevalence found in this study (9.3%) was more than twice (4.6%) that reported previously by Ferreira et al.[60]. They used data from 2015, focusing on children under 24 months from all socioeconomic statuses in the state of Alagoas. It is important to emphasize that our study sample consists entirely of socially vulnerable children assisted by the Bolsa Família Program, and the data collection occurred before the COVID-19 pandemic. With the documented growth of health inequities and economic disparities, resulting in an increase in food insecurity, our findings raise concerns about the potential impact of the pandemic on long-term stunting prevalence in Alagoas and globally[1,38].

It is important to consider that the present study has some limitations. The conceptual path diagram used in this study does not include sociodemographic characteristics that are often associated with child stunting, such as, household income, family size, housing location (urban/rural), drinking water, sanitation and food insecurity[8]. We made an effort to include these factors in the SEM model, however, their inclusion did not result in an improvement in the fit indexes, suggesting that these variables did not enhance the overall model fit. This can probably be attributed to the homogeneity of the sample, which comprises individuals with high social vulnerability assisted by the Bolsa Família Program. Another limitation was the non-probabilistic sampling approach, which may cause selection bias, including only those who have more access to health services and possibly greater health care. However, we reinforce that all eligible children were invited to participate in the study, and the data collection was performed in all Community Health Centre in the municipalities, both in urban and rural areas. Despite these limitations, this study provides up-to-date data using SEM technique regarding the effects of parental and children’s factors on length-for-age among socially vulnerable children under 2 years of age from a poor Brazilian state. Considering the potential similarities between the investigated population and those in various regions nationally and globally, the results of this research may prove useful to other regions.

In conclusion, the findings of the SEM analysis underscore the continued significance of addressing stunting among socially vulnerable Brazilian children under 2 years old. Notably, our research emphasizes the pivotal role of proper feeding practices, including promoting breastfeeding initiation and duration, avoiding bottle feeding, ensuring access to a

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diverse and nutrient-rich diet at a proper frequency to achieve a minimum acceptable diet, and limiting sweet beverage consumption, in promoting increased length-for-age in this vulnerable population. Additionally, urgent regulatory measures are needed to control the dissemination of unhealthy foods, particularly those targeted at children. These insights contribute valuable knowledge for crafting targeted interventions, policies, and programs, which, in conjunction with the Bolsa Família Program, aimed at enhancing the nutritional well-being and promoting adequate linear growth and development of young children in similar contexts.

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DECLARATION OF INTERESTS

The author(s) declare none

AUTHORSHIP

NORMANDE, M. M. M. participated in designing the study, acquiring and entering data, analyzing and interpreting the results, and drafting the article. SILVA, L. C., MENEZES, R. C. E. and FLORÊNCIO, T. M. M. were involved in data analysis, interpretation, and writing. CLEMENTE, A. P. G. obtained financial support, contributed to project conception, coordinated all implementation steps and performed the final article review. All authors approved the final version for submission.

List of Abbreviations

Abbreviation	**Definition**
BFP	Bolsa Família Program
CECAD	Consultation, Selection and Extraction of Information from the Unified Registry
CI	Confidence Interval
CFI	Comparative Fit Index
DAG	Directed Acyclic Graph
df	Degrees of Freedom Ratio
HDI	Human Development Index
IYCF	Indicators for assessing infant and young child feeding practices
ML	Maximum-likelihood
OR	Odds Ratio
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Modelling
SED	Standardize Direct Effect
SIE	Standardize Indirect Effect
STROBE-nut	STrengthening the Reporting of OBservational studies in Epidemiology – Nutritional Epidemiology
TLI	Tucker–Lewis index
UNICEF	United Nations Children's Fund
WHO	World Health Organization
χ^2	Chi-square Test

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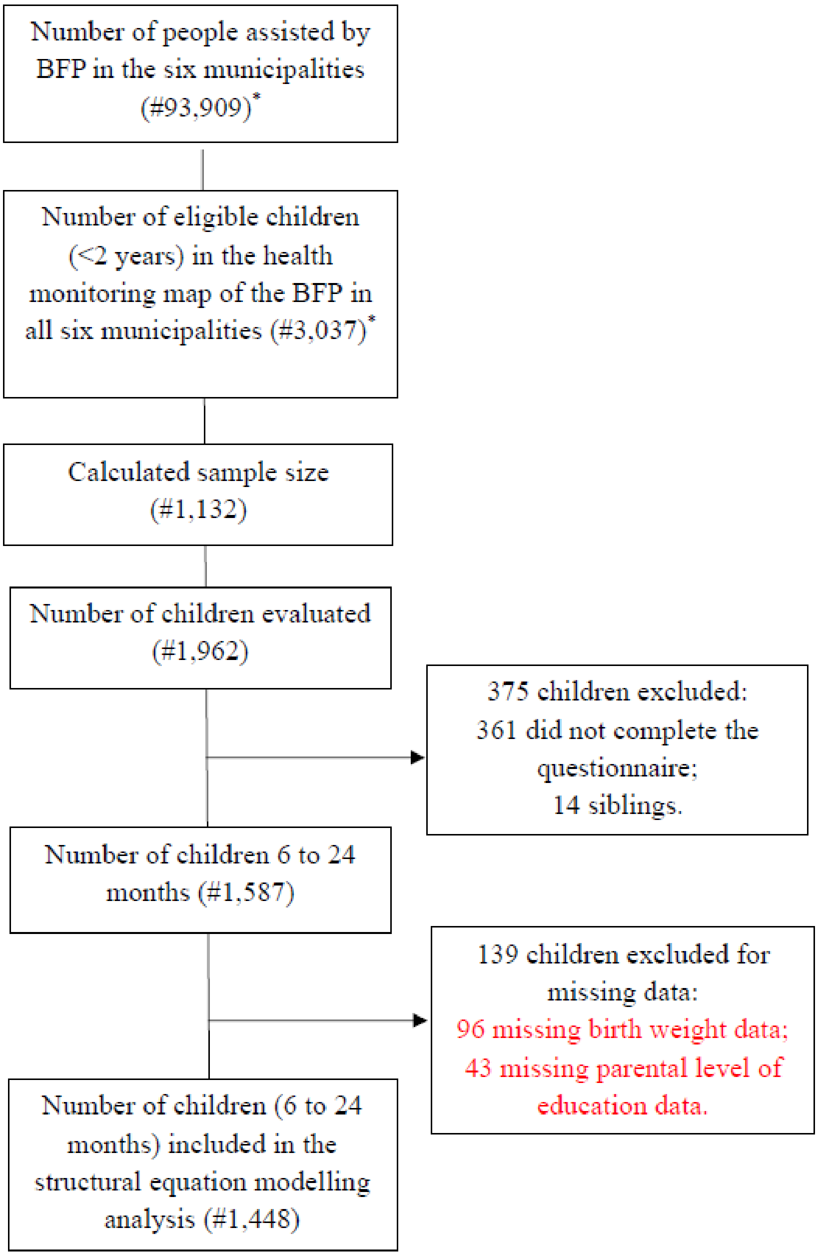

Figure 1. Flow diagram for selection of study participants.

BFP, Bolsa Família Program

*As registered in the Consultation, Selection and Extraction of Information from the Unified Registry (CECAD)

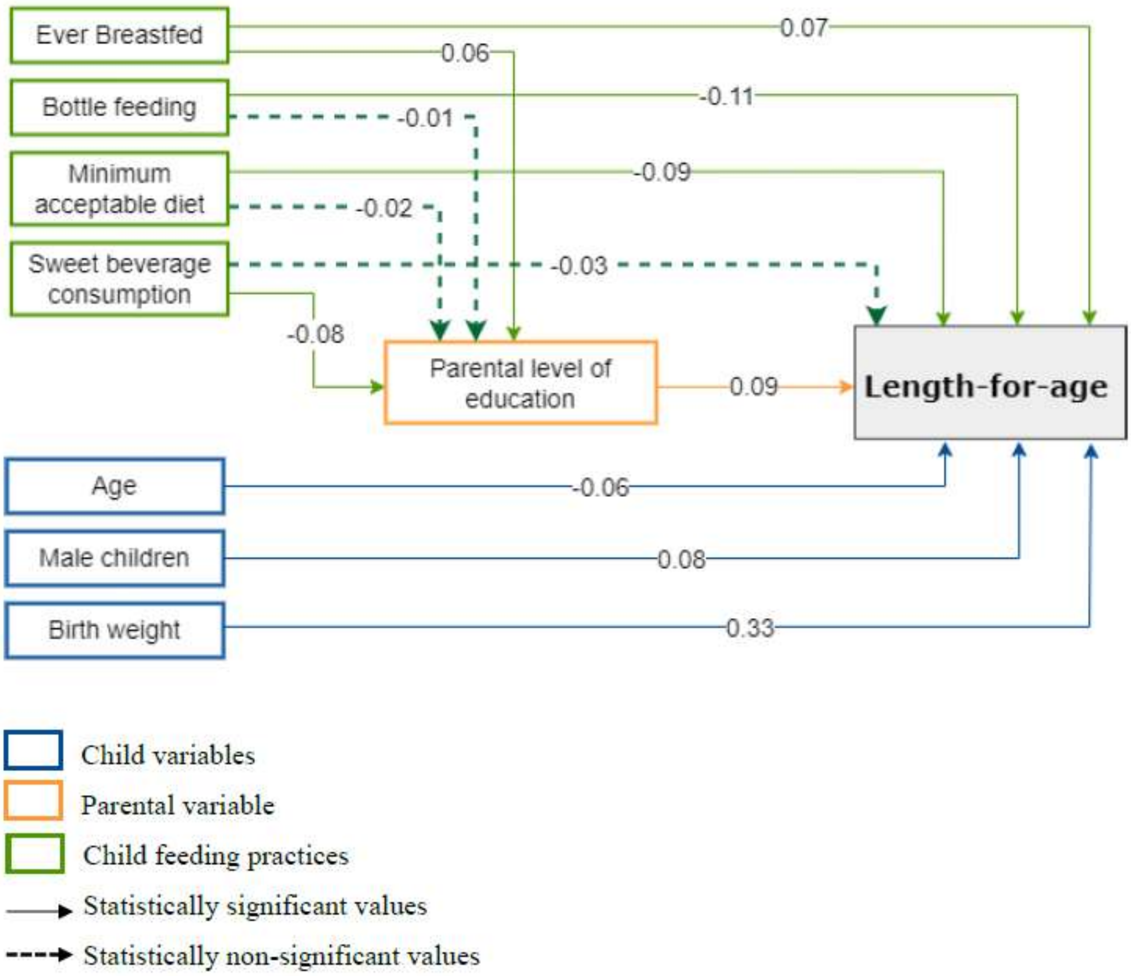

Figure 2 Structural equation model exploring the effects of parental level of education and child factors on length-for-age indicator in socially vulnerable children aged 6–24 months, Alagoas, Brazil, 2018.

Table 1 Parental level of education and child characteristics according to stunting status of socially vulnerable children aged 6–24 months, Alagoas, Brazil, 2018.

Variables	Total (n 1,448)		Stunted* (n 135)		Non-stunted† (n 1,313)		χ2 test
	n‡	%‡	n‡	%‡	n‡	%‡	P-value
Child characteristics							
Sex							
Female	729	50.3	53	39.3	676	51.5	0.009
Male	719	49.7	82	60.7	637	48.5	
Age (months)							
6-11	477	32.9	39	28.9	438	33.4	
12-17	495	34.2	47	34.8	448	34.1	0.525
18-24	476	32.9	49	36.3	427	32.5	
Birth weight							
Low	109	7,5	27	20.0	82	6.2	
Normal	1,237	85,4	103	76.3	1,134	86.4	<0.001
High	102	7,0	5	3.7	97	7.4	
Ever breastfed							
Yes	1,346	93.0	119	88.1	1,227	93.5	0.032
No	102	7.0	16	11.9	86	6.5	
Bottle feeding							
Yes	936	64.6	72	53.3	864	65.8	0.005
No	512	35.4	63	46.7	449	34.2	
Sweet beverage consumption							
Yes	473	32.7	48	35.6	425	32.4	0.443
No	975	67.3	87	64.4	888	67.6	
Minimum acceptable diet							
Yes	979	67.6	104	77.0	875	66.6	0.015
No	469	32.4	31	23.0	438	33.4	
Parental level of education (years)							
None	82	5.7	4	3.0	78	5.9	
<9	498	34.4	62	45.9	436	33.2	0.012
9-12	821	56.7	63	46.7	758	57.7	
>12	47	3.2	6	4.4	41	3.1	

*Stunted = Length-for-age < -2 Z-score.

†Non-stunted = Length-for-age ≥ -2 Z-score.

‡Values are presented as total number (n) and frequency (%) for categorical variables.

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Table 2 Study model fit analyzes and acceptable cutoffs fit indexes according to Schreiber et al., 2006.

Index	Study final model	Acceptable cutoffs
χ^2	3.058	-
df	3	-
p-value	0.383	>0.05
χ^2/df	1.019	<3
RMSEA	0.004	<0.06
CFI	1.000	>0.95
TLI	0.999	>0.95

χ^2, Chi-square test; df, Degrees of freedom ratio; RMSEA, Root Mean Square Error of Approximation; CFI, Comparative Fit Index; TLI, Tucker–Lewis index.

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Table 3 Direct and indirect effects on length-for-age indicator in socially vulnerable children aged 6–24 months, Alagoas, Brazil, 2018.

Variables	Reference	SDE	95%CI	SIE	95%CI
Length-for-age	Continuous	-	-	-	-
Sex	Male	0.08*	0.075; 0.300	-	-
Age	Continuous	-0.06*	-0.025; -0.002	-	-
Birth weight	Continuous	0.33*	0.618; 0.826	-	-
Ever breastfed	No	0.07*	0.105; 0.552	0.06*	0.155; 1.564
Bottle feeding	Yes	-0.11*	-0.407; -0.157	-0.01	-0.450; 0.339
Sweet beverage consumption	Yes	-0.03	-0.133; 0.119	-0.08*	-0.980; -0.196
Minimum acceptable diet	No	-0.09*	-0.350; -0.102	-0.02	-0.548; 0.238
Parental level of education	Continuous	0.09*	0.015; 0.047	-	-

SDE, Standardized Direct Effect; SIE, Standardized Indirect Effect; 95%CI, 95% confidence interval.

*The differences are statistically different from zero at the 95 %CI.

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