FOOD AND NUTRITION IN COLLECTIVE HEALTH
DOI: 10.12957/demetra.2024.75109

DEMETRA
Alimentação, Nutrição & Saúde
e-ISSN:2238-913X

Caroline Albach[1]
Emilaine Ferreira dos Santos[1]
Nadianne Thais Gabardo Xavier Negrão[2]
Angelica Rocha de Freitas Melhem[1]
Paula Chuproski Saldan[1]

[1] Universidade Estadual do Centro-Oeste, Curso de Nutrição, Departamento de Nutrição. Guarapuava, PR, Brasil.

[2] Secretaria Municipal de Saúde Guarapuava, Área de Nutrição. Guarapuava, PR, Brasil.

Correspondence
Paula Chuproski Saldan
pchuproski@unicentro.br

Assistant Editor
Ursula Viana Bagni

Food consumption and nutritional status of children under six months old followed up at a Primary Health Care: a temporal analysis from 2016 to 2021

Consumo alimentar e estado nutricional de crianças menores de seis meses acompanhadas na Atenção Primária à Saúde: uma análise temporal de 2016 a 2021

Abstract

Introduction: Exclusive breastfeeding (EBF) at the beginning of life is essential for a child's nutritional status and development. *Objective*: To analyze the temporal trend in the prevalence of EBF and the nutritional status of children under six months old registered and monitored at a Primary Health Care in Guarapuava-PR, in the State of Paraná, in the South Region and in Brazil, from 2016 to 2021. *Method:* Ecological study based on data from SISVAN Web, food consumption (EBF) and anthropometric indexes (weight/age, weight/height, height/age and BMI/age). Prais-Winsten linear regression was used to analyze trends. *Results:* A stationary trend was observed in the EBF rate at all levels assessed. In Guarapuava-PR, there was an increased trend towards marked thinness (Annual Percentage Variation (APV)=0.093; p=0.042) and overweight risk (APV=0.071; p=0.019) according to the weight/height index. In the State of Paraná, BMI/age presented a decreased trend in marked thinness (APV=-0.049; p=0.010). The South Region showed an increased trend towards eutrophy (APV=0.006; p=0.042) in relation to weight/age and overweight (APV=0.042; p=0.037) according to weight/height. In Brazil, weight/age showed an increased trend towards eutrophy (APV=0.009; p=0.013) and a decreased trend towards obesity (APV=-0.066; p=0.031) according to BMI/age. *Conclusion:* The EBF rate remained stationary over the period evaluated in all locations. There was an increase in marked thinness and the risk of overweight locally and in overweight in the South Region and, on the other hand, there was a decrease in marked thinness in the State of Paraná and in obesity in Brazil.

Keywords: Breastfeeding. Infant Nutrition. Nutritional Status. Health Information Systems. Food and Nutrition Surveillance.

Resumo

Introdução: A alimentação, por meio do aleitamento materno exclusivo (AME) no início da vida, é primordial para o adequado estado nutricional e desenvolvimento da criança. *Objetivo*: Analisar a tendência temporal da

prevalência de AME e do estado nutricional de crianças menores de seis meses cadastradas e acompanhadas na Atenção Primária à Saúde de Guarapuava-PR, no estado do Paraná, na Região Sul e do Brasil, no período de 2016 a 2021. *Método*: Estudo ecológico com base em dados do SISVAN *Web*, de consumo alimentar (AME) e índices antropométricos (peso/idade, peso/altura, altura/idade e IMC/idade). Para a análise de tendência, foi empregada a regressão linear de Prais-Winsten. *Resultado*: Observou-se tendência estacionária na taxa de AME em todos os níveis avaliados. Em Guarapuava-PR, houve tendência crescente para magreza acentuada (Variação Percentual Anual (VPA)=0,093; p=0,042) e risco de sobrepeso (VPA=0,071; p=0,019) segundo o índice peso/altura. No estado do Paraná, o IMC/idade apresentou tendência decrescente de magreza acentuada (VPA=-0,049; p=0,010). A Região Sul apresentou tendência crescente do estado de eutrofia (VPA=0,006; p=0,042) em relação ao peso/idade e de sobrepeso (VPA=0,042; p=0,037) segundo o peso/altura. No Brasil, o peso/idade apontou tendência crescente para eutrofia (VPA=0,009; p=0,013) e tendência decrescente para obesidade (VPA=-0,066; p=0,031) segundo o IMC/idade. *Conclusão*: A taxa de AME manteve-se estacionária no período avaliado em todas as localidades. Houve crescimento da magreza acentuada e do risco de sobrepeso em nível local e de sobrepeso na Região Sul e, por outro lado, evidenciou-se decréscimo da magreza acentuada no estado do Paraná e da obesidade no Brasil.

Palavras-chave: Aleitamento Materno. Nutrição do Lactente. Estado Nutricional. Sistemas de Informação em Saúde. Vigilância Alimentar e Nutricional.

INTRODUCTION

The national guideline for infant feeding recommends that a child should be breastfed for two years or more, only breast milk for the first six months,[1] has given the numerous benefits of this food for the child, the mother, the family and society.[2]

Brazil has actions, strategies and public policies aimed at women's health in different stages of their life, which encompass pregnancy, following after birth and, consequently, generate a network of care for the newborn, providing care for the mother and the child.[3,4]

One of these actions is the *Estratégia Nacional para Promoção do Aleitamento Materno e Alimentação Complementar Saudável no Sistema Único de Saúde* (SUS) – *Estratégia Amamenta* e *Alimenta Brasil* (EAAB) (National Strategy to Promote Breastfeeding and Healthy Complementary Feeding in the Public Health System - Breastfeeding Strategy and Feeding Brazil) which aims to qualify the work process of professionals at a Primary Health Care (PHC) so that they can guide mothers through the act of breastfeeding. The aim is to improve breastfeeding rates and encourage healthy complementary feeding.[4]

Feeding at the beginning of life has a direct impact on a child's nutritional status, and it is important to monitor food consumption and anthropometric indicators in order to identify early nutritional deviations.[5]

Since the 1990s, there has been a health information system used to monitor the nutritional status of the Brazilian population, including children, known as the *Sistema de Vigilância Alimentar e Nutricional* (SISVAN) (Food and Nutrition Surveillance System), which has been constantly updated and improved.[6,7]

In 2008, the online version of the system was released, known as SISVAN Web, which now includes tools for assessing food consumption markers and use locally.[7]

In 2015, the Ministry of Health revised the food consumption markers assessed in PHC and registered in SISVAN and, for children under six months old, the marker called Exclusive Breastfeeding (EBF) is used.[8] Four anthropometric indexes are recommended for assessing the nutritional status of children under six months old: weight for age (W/A), weight for height (W/H), height for age (H/A) and body mass index for age (BMI/A).[5,9]

The literature on children's food consumption and nutritional status using the four anthropometric indexes shows that most studies focus on assessing infant feeding and nutrition in children under two years of age, including children under six months of age.[10-12]

One study reported a 56.1% prevalence of EBF in children under six months of age through SISVAN reports in the country in 2015.[13] According to the Ministry of Health, in 2020, 54% of the Brazilian children under six months of age were on EBF, according to SISVAN records.[12] In the State of Paraná, in 2022, according to SISVAN data, 56% of the children under six months of age were on EBF, and according to BMI/A, 5.03% were malnourished (marked thinness and thinness), 4.82% were overweight and 2.39% were obese.[14]

In view of the above, the aim of this study was to analyze the temporal trend in the prevalence of EBF and the nutritional status of children under six months of age registered and monitored in the PHC in Guarapuava-PR, the State of Paraná, in the South Region and in Brazil from 2016 to 2021.

METHOD

This is an ecological study in which all the data used were from reports extracted from SISVAN Web, a online version of the system, available to the entire population. All the data was collected in 2022 and covered a period of six years (2016 to 2021), referring to the prevalence of EBF and the nutritional status of children

under six months of age registered in the system by PHC professionals in the city of Guarapuava-PR, compared with data from the State of Paraná, in the South Region and in Brazil.

Guarapuava is a city located in the South central region of the State of Paraná, with a population of 182,093 inhabitants according to the 2022 census.[15,16] It is the fifth health region in the State, and is a reference for 19 cities around the region, and is part of the Eastern Health Macroregional of the State. PHC has 33 Family Health Strategies and, in 2020, PHC coverage was 70.21%.[17]

The following food consumption indicator for children under six months of age was analyzed: EBF in children under six months old. This indicator takes into account nine questions from the "*Formulário de marcadores de consumo alimentar na atenção básica*" (Food consumption markers in primary care form), applied by health professionals to the person responsible for the child. The indicator was taken directly from SISVAN Web, considering the proportion of children aged up to 5 months and 29 days old who exclusively received breast milk one day before the assessment.[8]

The nutritional status of children under six months of age was assessed according to the four anthropometric indexes with the cut-off points recommended by the SISVAN Technical Standard: weight for age (W/A), weight for height (W/H), height for age (H/A) and body mass index for age (BMI/A).[5,9]

The reports were collected from this website https://sisaps.saude.gov.br/sisvan/relatoriopublico/index and were generated by combining the following variables:

1-Type of report (Food Consumption), years of reference (2016, 2017, 2018, 2019, 2020 and 2021), Months of reference (ALL), grouped by (City), State (PR), City (Guarapuava), age group (under six months), type of report (indicator - exclusive breastfeeding in children under six months old), gender (ALL), race/color (ALL), registered follow-ups (ALL), population and community (ALL), schooling (ALL).

2-Type of report (Nutritional status), years of reference (2016, 2017, 2018, 2019, 2020 and 2021), Months of reference (ALL), group by (City), State (PR), City (Guarapuava), coverage region (ALL), life stages (Child), Age (0 to 6 months), Index (Weight x Age; Weight x Height; Height x Age and BMI x Age), gender (ALL), race/color (ALL), registered follow-ups (ALL), population and community (ALL), schooling (ALL).

After generating the reports according to year (2016 to 2021), the data was entered into the Microsoft Excel® program for further analysis. For the prevalence of EBF, the descriptive analysis of the data included percentage values over the study period presented in a graph form. The parameters of the World Health Organization (WHO) were used to assess the EBF situation in each location of the study, with prevalence rates of 0 to 11% classified as very bad; 12 to 49%, bad; 50 to 89%, good; and 90 to 100%, very good.[18]

Subsequently, a temporal trend analysis on the prevalence of EBF and the nutritional status of children under six months of age was carried out using Prais-Winsten generalized linear regression.[19] The dependent variables were the prevalence of EBF and nutritional status according to the four anthropometric indexes evaluated. The years of the temporal series (2016-2021) were used as the independent variable.

Although it is not recommended to analyze series with less than seven points (years) due to the low statistical power of regression analysis, which makes it difficult to identify a significant trend,[19] the period chosen for the study was due to the availability of updated food consumption data on SISVAN Web only from 2015 onwards. The data for the city of Guarapuava was only available in 2016, due to the new food consumption markers.

According to Antunes & Cardoso,[19] the prevalence of EBF and the nutritional status of children under six months old should be log-transformed in order to reduce the heterogeneity of variance in the residuals of the regression analysis.

The rates of annual increase in the prevalence of EBF and nutritional status, as well as the respective confidence intervals, were obtained by applying the following formulas.[20]

Annual growth rate= $(-1+10^{\beta})*100\%$
95%CI= $-1+10^{(\beta \pm t(0.05;n-1)xSE)}$

The regression coefficient (β) and the standard error (SE) of the beta estimate were provided by the Prais-Winsten regression, and the *t* value was obtained using the two-tailed Student's t-distribution table, with a 5% significance level, considering the number of years in the series -.1[6 20,21]

The temporal trend was interpreted by looking at the confidence interval. When the value zero was contained in the interval, the trend was considered stationary; otherwise, the trend was increasing when the increased rate was positive, or decreased when it was negative, when $p<0.05$.

For the Prais-Winsten regression analysis, the IBM SPSS (Statistical Package for the Social Sciences) version 25.0 statistical program was used.

Due to the nature of the study and the use of databases in the public domain and without the possibility of identifying the individual, the study did not need to be assessed by a Human Research Ethics Committee (CEP), in accordance with National Health Council (CNS) Resolution 510 of April 7, 2016.[22]

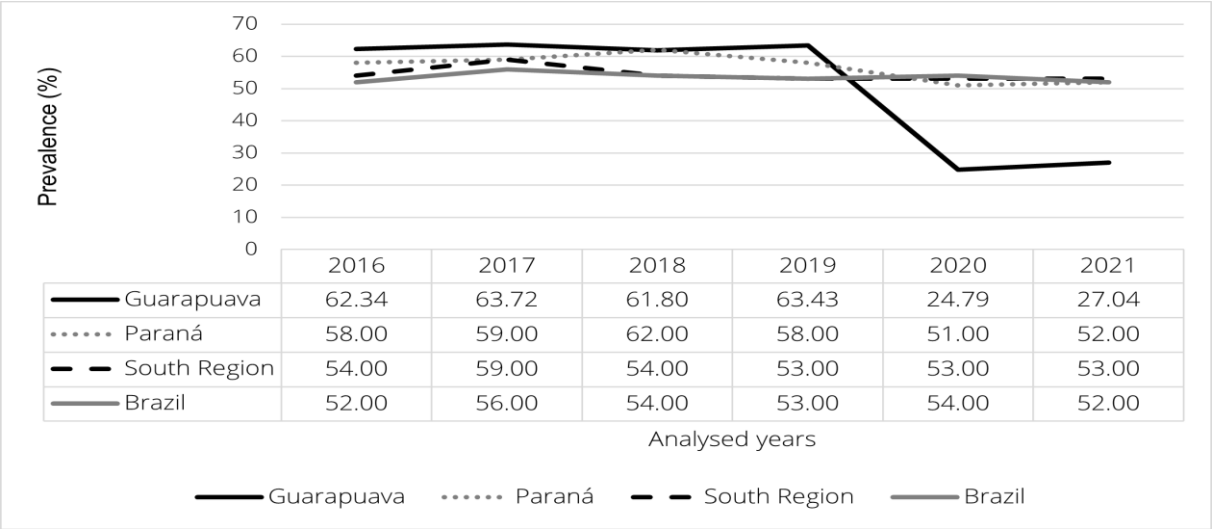
RESULTS

The total number of children under six months of age with food consumption data (EBF) in the study period (2016 to 2021) was 2,856 in Guarapuava-PR, 17,278 in the State of Paraná, 51,315 in the South Region and 436,757 in Brazil. The number of children in this age group with a record of nutritional status was higher at all levels assessed, with 5,133 children locally, 160,366 in the State of Paraná, 380,996 in the South and 1,900,409 nationally.

There was a reduction in the number of children with food consumption records from 2020 and 2021, compared to 2019, in the State of Paraná, in the South Region and in Brazil, but Guarapuava presented a different behavior from the other units with an increase in the number of food consumption registered in 2020 (n=722) compared to 2019 (n=309), with a reduction in 2021 (n=466).

The prevalence of EBF in children under six months of age registered and monitored at the PHC in Guarapuava-PR remained between 2016 and 2019 at 62.34% and 63.43%, respectively. In 2020, the values dropped to 24.79% and in 2021 the prevalence of EBF in children under six months old reached 27.04%, indicating a drop in the food consumption indicator, as shown in Graph 1. This behavior experienced in the city did not follow the pattern of the State of Paraná, in the South Region and in Brazil, which maintained EBF rates close to 50% (Graph 1).

Graph 1. Prevalence of Exclusive Breastfeeding in children under six months of age registered and monitored at a Primary Health Care in Guarapuava-PR, in the State of Paraná, in the South Region and in Brazil, 2016 to 2021.



According to WHO parameters for EBF prevalence, Guarapuava obtained rates considered good between 2016 and 2019 and poor in 2020 and 2021. At the other levels evaluated, the rates were considered good in all the years of the temporal series.

When the temporal trend of EBF prevalence was analyzed, it was observed that the city of Guarapuava, in the State of Paraná, in the South Region and in Brazil presented a stationary trend in the study period with Annual Percentage Variation (APV)=-0.185; 95%CI=-0.270-6.743; p=0.075, APV=-0.029; 95%CI=-0.047-8.631; p=0.182, APV=-0.015; 95%CI=-0.023-8.799; p=0.095, APV=-0.004; 95%CI=-0.009-8.942; p=0.411, respectively.

The temporal trend in the prevalence of nutritional status according to the weight/age index showed that the classification of adequate weight for age showed an increased trend in the South and in Brazil, with APV=0.006 (p=0.042) and APV=0.009 (p=0.013), respectively, representing a positive point (Table 1).

Table 1. Trends in the prevalence of very low weight, low weight, adequate weight and high weight according to the weightforage index in children under six months of age in Guarapuava-PR, in the State of Paraná, in the South Region and in Brazil, 2016 to 2021.

Nutritional Status/Location	APV	95%CI	p-value*	Trend
Very low weight				
Guarapuava	-0.162	-0.323; 0.036	0.119	Stationary
Paraná	-0.100	-0.205; 0.018	0.114	Stationary
South Region	-0.079	-0.177; 0.030	0.152	Stationary
Brazil	-0.073	-0.181; 0.049	0.210	Stationary
Low weight				
Guarapuava	0.006	-0.100; 0.126	0.879	Stationary
Paraná	-0.090	-0.186; 0.018	0.114	Stationary

Table 1. Trends in the prevalence of very low weight, low weight, adequate weight and high weight according to the weightforage index in children under six months of age in Guarapuava-PR, in the State of Paraná, in the SouthRegion and in Brazil, 2016 to 2021.(Continues)

Nutritional Status/Location	APV	95%CI	p-value*	Trend
South Region	-0.079	-0.172; 0.023	0.138	Stationary
Brazil	-0.088	-0.175; 0.008	0.094	Stationary
Adequate weight				
Guarapuava	0.002	-0.003; 0.008	0.305	Stationary
Paraná	0.006	0.000; 0.012	0.094	Stationary
South Region	**0.006**	**0.001; 0.012**	**0.042**	**Increased**
Brazil	**0.009**	**0.003; 0.015**	**0.013**	**Increased**
High weight				
Guarapuava	0.037	-0.067; 0.154	0.434	Stationary
Paraná	-0.013	-0.097; 0.077	0.705	Stationary
South Region	-0.002	-0.076; 0.077	0.934	Stationary
Brazil	-0.020	-0.060; 0.020	0.316	Stationary

APV=Annual Percentage Variation; CI=Confidence Interval; *Linear regression - Prais-Winsten method

.As described in Table 2 in relation to the weight/height index, there were increased trends towards marked thinness with APV=0.093 (p=0.042) and risk of overweight with APV=0.071 (p=0.019) in Guarapuava and an increased trend towards overweight in the South Region with APV=0.042 (p=0.037).

Table 2. Trends in the prevalence of marked thinness, thinness, eutrophy, risk of overweight, overweight and obesity according to the weight for height index in children under six months of age in Guarapuava-PR, in the State of Paraná, in the South Region and in Brazil, 2016 to 2021.

Nutritional Status/Location	APV	95%CI	p-value*	Trend
Marked thinness				
Guarapuava	**0.093**	**0.024; 0.167**	**0.042**	**Increased**
Paraná	-0.200	-0.383; 0.037	0.113	Stationary
South Region	-0.179	-0.356; 0.045	0.123	Stationary
Brazil	-0.123	-0.234; 0.004	0.086	Stationary
Thinness				
Guarapuava	0.101	-0.049; 0.277	0.186	Stationary
Paraná	-0.104	-0.218; 0.025	0.131	Stationary
South Region	-0.092	-0.203; 0.034	0.156	Stationary
Brazil	-0.066	-0.156; 0.032	0.176	Stationary

Table 2. Trends in the prevalence of marked thinness, thinness, eutrophy, risk of overweight, overweight and obesity according to the weight forheight index in children under six months of age in Guarapuava-PR, in the State of Paraná, in the South Region and in Brazil, 2016 to 2021.(Continues)

Nutritional Status/Location	APV	95%CI	p-value*	Trend
Eutrophy				
Guarapuava	-0.018	-0.035; -0.000	0.054	Stationary
Paraná	0.011	-0.006; 0.029	0.257	Stationary
South Region	0.009	-0.002; 0.021	0.198	Stationary
Brazil	0.009	-0.002; 0.021	0.144	Stationary
Risk of overweight				
Guarapuava	0.071	0.034; 0.110	0.019	Increased
Paraná	0.054	-0.000; 0.112	0.088	Stationary
South Region	0.059	0.010; 0.110	0.060	Stationary
Brazil	0.039	-0.002; 0.083	0.093	Stationary
Overweight				
Guarapuava	0.042	-0.101; 0.208	0.522	Stationary
Paraná	0.042	-0.011; 0.099	0.125	Stationary
South Region	0.042	0.011; 0.073	0.037	Increased
Brazil	0.018	-0.045; 0.087	0.535	Stationary
Obesity				
Guarapuava	0.000	-0.137; 0.159	0.994	Stationary
Paraná	-0.025	-0.274; 0.222	0.599	Stationary
South Region	-0.033	-0.188; 0.053	0.221	Stationary
Brazil	-0.027	-0.131; -0.012	0.121	Stationary

APV=Annual Percentage Variation; CI=Confidence Interval; *Linear regression - Prais-Winsten method

When analyzing the temporal trend in the prevalence of nutritional status using the height/age index, it was noted that this index presented a stationary trend for all levels analyzed (Table 3).

Table 3. Trends in the prevalence of very low height, low height and adequate height according to the height forage index in children under six months of age in Guarapuava-PR, in the State of Paraná, in the South Region and in Brazil, 2016 to 2021.

Nutritional Status/Location	APV	95%CI	p-value*	Trend
Very low height				
Guarapuava	-0.096	-0.311; 0.186	0.411	Stationary

Table 3. Trends in the prevalence of very low height, low height and adequate height according to the heightforage index in children under six months of age in Guarapuava-PR, in the State of Paraná, in the South Region and in Brazil, 2016 to 2021. (Continues)

Nutritional Status/Location	APV	95%CI	p-value*	Trend
Paraná	-0.025	-0.128; 0.091	0.613	Stationary
South Region	-0.022	-0.045; 0.000	0.104	Stationary
Brazil	-0.031	-0.144; 0.096	0.555	Stationary
Low height				
Guarapuava	0.009	-0.129; 0.170	0.893	Stationary
Paraná	0.000	-0.011; 0.011	0.849	Stationary
South Region	-0.011	-0.034; 0.012	0.308	Stationary
Brazil	-0.033	-0.100; 0.037	0.326	Stationary
Adequate height				
Guarapuava	0.004	-0.013; 0.022	0.580	Stationary
Paraná	0.002	-0.003; 0.008	0.590	Stationary
South Region	0.002	0.002; 0.002	0.138	Stationary
Brazil	0.002	-0.009; 0.014	0.493	Stationary

APV=Annual Percentage Variation; CI=Confidence Interval; *Linear regression - Prais-Winsten method

Table 4 shows a decreased trend for marked thinness with APV=-0.049 (p=0.010) in the State of Paraná and a decreased trend for obesity with APV=-0.066 (p=0.031) in Brazil according to the BMI/age index.

Table 4. Trends in the prevalence of marked thinness, thinness, eutrophy, risk of overweight, overweight and obesity according to BMI for age in children under six months in Guarapuava-PR, the State of Paraná, in the South Region and in Brazil, 2016 to 2021.

Nutritional Status/Location	APV	95%CI	p-value*	Trend
Marked thinness				
Guarapuava	-0.081	-0.356; 0.309	0.583	Stationary
Paraná	**-0.049**	**-0.071; -0.026**	**0.010**	**Decreased**
South Region	-0.045	-0.099; 0.013	0.139	Stationary
Brazil	-0.033	-0.136; 0.081	0.475	Stationary
Thinness				
Guarapuava	0.066	-0.035; 0.179	0.205	Stationary
Paraná	0.002	-0.055; 0.063	0.958	Stationary
South Region	0.000	-0.057; 0.060	0.966	Stationary

Table 4. Trends in the prevalence of marked thinness, thinness, eutrophy, risk of overweight, overweight and obesity according to BMI for age in children under six months in Guarapuava-PR, the State of Paraná, in the South Region and in Brazil, 2016 to 2021. (Continues)

Nutritional Status/Location	APV	95%CI	p-value*	Trend
Brazil	0.004	-0.058; 0.072	0.844	Stationary
Eutrophy				
Guarapuava	-0.011	-0.028; 0.006	0.157	Stationary
Paraná	0.002	-0.015; 0.020	0.823	Stationary
South Region	0.000	-0.005; 0.005	0.905	Stationary
Brazil	0.002	-0.003; 0.008	0.637	Stationary
Risk of overweight				
Guarapuava	0.044	-0.003; 0.095	0.093	Stationary
Paraná	0.009	-0.025; 0.045	0.566	Stationary
South Region	0.016	-0.013; 0.046	0.254	Stationary
Brazil	0.011	-0.006; 0.029	0.246	Stationary
Overweight				
Guarapuava	0.044	-0.109; 0.225	0.542	Stationary
Paraná	0.009	-0.059; 0.083	0.777	Stationary
South Region	0.016	-0.019; 0.052	0.345	Stationary
Brazil	0.006	-0.010; 0.024	0.298	Stationary
Obesity				
Guarapuava	-0.053	-0.253; 0.199	0.596	Stationary
Paraná	-0.073	-0.281; 0.195	0.492	Stationary
South Region	-0.083	-0.190; 0.037	0.166	Stationary
Brazil	**-0.066**	**-0.109; -0.021**	**0.031**	**Decreased**

APV=Annual Percentage Variation; CI=Confidence Interval; *Linear regression - Prais-Winsten method

DISCUSSION

The trend in the EBF rate was stationary in all the units evaluated; however, the city of Guarapuava showed a sharp decrease in the prevalence in 2020 and 2021, when compared to the State of Paraná, in the South Region and in Brazil. With regard to the children's nutritional status, Guarapuava presented an increased trend of marked thinness and risk of overweight; and in the South Region, an increased trend of overweight according to the weight/height index. In the State of Paraná, there was a decreased trend in marked thinness, and in Brazil, a decreased trend in obesity according to BMI for age. An increased trend in adequate weight for age was reported for the South Region and in Brazil.

This present study revealed that food consumption registrations were lower than the nutritional status in the period analyzed at all levels (Local, State, Regional and National), which indicates that PHC professionals carry out more assessments and registers anthropometric data such as weight and height of children under six months old than of food consumption.

It should be noted that the food consumption markers were updated in 2015 and the data on children's nutritional status predates the date and has not changed over time. In addition, for the EBF marker, it is necessary for the professional who cares for a child under six months of age to investigate feeding in the last 24 hours by means of nine questions applied to the person responsible for the child, which can be time-consuming and justify the low records of the indicator.

In order to increase these registrations, the Ministry of Health published an Ordinance No. 1,127/2021, which deals with financial incentives for the States, the Federal District and cities to structure and implement food and nutritional actions based on the *Política Nacional de Alimentação e Nutrição* (National Food and Nutritional Policy), one of whose guidelines is the organization of *Atenção Nutricional no SUS* (Nutritional Care in the Public Health).[23,24]

The trend in the prevalence of EBF was stationary for the State of Paraná, in the South Region and in the country; however, for the city studied, in the last two years evaluated, although the rate also remained stationary, there was a sharp decrease in the EBF rate, even though the city showed an increase in food registrations in 2020.

According to WHO, the data for the citiy of Guarapuava in 2016 to 2019 can be classified as good, as they were in the 50-89% range. The data in 2020 and 2021, on the other hand, were classified as poor, given that the prevalence of EBF was between 12-49%. For the State of Paraná, in the South Region and in Brazil, the rates remained good in all the years analyzed.[18]

Oliveira et al.,[25] in their cross-sectional survey on EBF in the State of Paraná in the context of the pandemic, observed that in 2019 and 2020, the prevalence of EBF was relatively low when compared to previous years, and for 2020, starting in June, the percentages were 69%, reaching 38% in December.[25] These values may be reflecting on the Covid-19 pandemic. During the pandemic, lifestyles had to be changed, and it was common for PHC to change the way it provided care; its actions were focused on emergency care or care involving Covid-19 symptoms, often interrupting services such as childcare, conversation circles and groups for pregnant women. This may be a possible explanation for the sharp decrease on EBF data in 2020 to 2021 in the city of the study.

In a quantitative-qualitative research with 10 pregnant women from two basic health units in the city of Sorocaba-SP, in 2016, workshops with specific themes demonstrated the role of educational strategies promoting prenatal care, the exchange of experiences, the knowledge acquired and the clarification of doubts in this very important period for the mothertobe.[26] These spaces are essential for encouraging and promoting breastfeeding.

A cross-sectional study carried out in Guarapuava in 2004 on feeding practices with children under one year old found a prevalence of 37.3% for EBF in children under six months old.[27] Saldan et al.[28] analyzed, through a cross-sectional study using WHO indicators, the breastfeeding practices of children under two years old in the city of Guarapuava in 2012, with a total of 1,814 children, and found that 36.0% of the children under six months old were EBF.[28] The SISVAN on EBF data in Guarapuava in 2021 shows even lower figures (27.04%) than those reported in the two studies carried out in the city. However, the studies cited do not only reflect the prevalence of EBF among children who use PHC, but for the whole city, which may limit comparisons.

According to the *Estudo Nacional de Alimentação e Nutrição Infantil* (ENANI) (National Infant Feeding and Nutrition Study), the prevalence of EBF in children under six months old stood out in the South, with 54.3%, and 45.8% in Brazil.[29] However, ENANI was carried out in 2019, before the Covid-19 pandemic, which probably influenced the prevalence of EBF. In 2019, Guarapuava had an EBF rate of 63.43%, which is above the values reported by ENANI in the South Region. The data from Guarapuava, however, represents children attended only at the PHC, while ENANI is a populational survey that was not restricted only to the population attending the PHC.

A study on the breastfeeding pattern and anthropometric status of children cared for at PHC in a city in the State of Bahia, involving 75 children under six months of age in 2018, indicated 36% on EBF and a risk of overweight of 13.3% using the BMI/A assessment. According to the weight/age index, 5.3% of the children were very underweight. According to the weight/height index, the risk of overweight was 6.7%, obesity 5.3% and overweight 4%.[30]

Amaral & Basso,[31] when analyzing the time spent breastfeeding with the nutritional status of 77 children aged 2-6 in a school in a city in the State of Rio Grande do Sul in 2010, through an anthropometric assessment of these children and the application of a questionnaire to their mothers, found a positive association between the time spent on EBF (equal to six months or more) and the adequacy of current nutritional status.[31]

In relation to the analysis of the trend in nutritional status according to four anthropometric indexes evaluated, the satisfactory result of the study is the growing trend towards adequacy of the weight/age index in the South and in Brazil. This index is recommended for monitoring weight gain and reflects the child's overall situation. However, it does not differentiate between acute and chronic conditions, and it is important to monitor the child's nutritional status in addition to other anthropometric indexes.[5]

According to the BMI/A, there was a marked decrease in thinness in the State of Paraná and in obesity in Brazil, also signaling positive progress for children under six months of age. On the other hand, the study pointed to a local increase in marked thinness and the risk of overweight, as well as an increase in overweight in the South Region according to the weight/height index, signaling a concerned data for the public assessed. This index should be interpreted with caution, as it expresses the harmony between the dimensions of body mass and height without considering the child's age, and may not represent the appropriate classification of the child when analyzed alone.[5] As the finding was an increase in inadequate nutritional status by the weight/height index for the city and in the South Region, it is believed that the result found is relevant and deserves attention from the city and State managers in public policies for children under six months of age.

According to SISVAN data, the temporal variation in the State of marked thinness and thinness among children under the age of two monitored at a PHC from 2016 to 2020 for the BMI/A index in the State of Paraná seems to indicate a decrease in the percentages in 2017 and 2018 (3.9% and 3.5%, respectively) compared to 2016 (4.2%). In the following years (2019 and 2020), however, the values returned to 2016 levels (4.5% and 4.2%, respectively).[12]

For the situation of weight excess (overweight and obesity) by BMI/A in Brazil, the temporal variation seems to indicate a slight decrease in the percentages from 2019 and 2020 (17.3% and 15.5%, respectively), when compared to the percentages from 2016 to 2018 (18.1%, 18.7% and 18.7%, respectively).[12] However, it should be noted that the data collected by the Ministry of Health on the situation of the children's nutritional status at a PHC analyzed the data of children under two years of age together, without stratification for children under six months of age. It also grouped together the classifications of marked thinness, thinness and overweight, which does not compare to the results.

Data from the report on the food and nutrition situation in Paraná from 2012 to 2022, which analyzed the nutritional status according to BMI/A of children under six months of age, points to a stabilization of malnutrition, represented by thinness and marked thinness, in the four macro-regions of the State, in this specific age group.[14] However, the report describes malnutrition as an aggregate of the classifications of thinness and marked thinness, which limits our comparisons.

The nutritional status of children under six months of age is a reflection of diet and living conditions, such as the level of food security or insecurity in the household, which has worsened in Brazilian households with children during the Covid-19 pandemic. Severe food insecurity doubled between December 2020 (9.4%) and early 2022 (19.8%) in households with children under 10 years of age.[32] In this context, the data found in this present study, of a local increase in marked thinness and the risk of overweight and overweight in the South Region, may reflect the food insecurity situation of the households in which these children live.

In addition, there is a double burden of malnutrition, represented by the increase in both malnutrition and overweight and the significant decreases in EBF rates from 2020 onwards locally. This has an impact on these children's health given the problems that can affect them and have repercussions throughout their lives, especially chronic non-communicable diseases. As for the Regional, State and National scenarios, although EBF rates are not satisfactory, no significant changes were observed and the trends in nutritional status found were favorable (a marked decrease in thinness in the State of Paraná, an increase in eutrophy in the South Region and in Brazil, and a decrease in obesity in Brazil).

In relation to the data found, it is not possible to directly relate the nutritional status findings with the EBF food consumption indicator reported in this study, due to the low registrations on the food consumption marker compared to the anthropometric data. While the coverage rate for nutritional status in Paraná in 2022 was 27.74%, there was only 1.47% coverage for food consumption assessment in the same year,[14] showing that the State needs to join forces to improve the coverage of the population's food registrations.

This study has limitations including the underuse of SISVAN by the health professionals, making it difficult for the system to feed, generate and cover data; in ways which food consumption and anthropometric data is collected, which may not be standardized by the various professionals and may compromise its quality; and the discussion and comparison of results with the data from studies that aggregated children under six months of age with children under two years of age.

CONCLUSION

In view of the decrease in breastfeeding rates in the last two years of the survey (2020 and 2021), it is important in the city of Guarapuava to redeem groups of pregnant women at the basic health units and strengthen actions to encourage breastfeeding in childcare consultations, with the aim of improving breastfeeding rates in the city.

There was a growing trend of marked thinness and risk of overweight according to the weight/height index in the city of Guarapuava, and an increase in overweight rates in the South Region. It is important to promote food and nutritional education actions to prevent these nutritional deviations, as well as to qualify the health team through strategies such as *Estratégia Amamenta e Alimenta Brasil* (EAAB) (Breastfeeding Strategy and Feeding Brazil). On a State and National level, there was a decreased trend in marked thinness and obesity, respectively, according to BMI/A.

The study provided an overview of the prevalence of EBF in the city of Guarapuava, in the State of Paraná, in the South Region and in Brazil, as well as the nutritional status of children under six months of age

in these regions. The importance of this type of research, aimed at this age group (under six months old) and covering the food marker and nutritional status, is highlighted in order to understand the current situation in which we live. It should be noted that in the literature it is still difficult to find studies that assess all the anthropometric indexes (weight/age, weight/height, height/age and BMI/age) separately for children under six months of age. It is known that each index has an applicability and anthropometric assessment of the child that should not be restricted to a single index.

There is a need for further research evaluating the EBF marker in the years following this study, to see if there are improvements in the indicators, especially for the city of the study and considering more points (years) of evaluation of the temporal series

REFERENCES

1. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Departamento de Promoção da Saúde. Guia alimentar para crianças brasileiras menores de 2 anos. Brasília: Ministério da Saúde; 2019.

2. Victora CG, Bahl R, Barros AJD, França GVA, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. Lancet, 2016;387:475-490. https://doi.org/10.1016/S0140-6736(15)01024-7

3. Ferreira HLOC, Oliveira MFD, Bernardo EBR, Almeida PCD, Aquino PDS, Pinheiro AKB. Fatores associados à adesão ao aleitamento materno exclusivo. Ciênc. saúde colet. 2018;23(3):683-690. https://doi.org/10.1590/1413-81232018233.06262016

4. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Estratégia Nacional para Promoção do Aleitamento Materno e Alimentação Complementar Saudável no Sistema Único de Saúde: manual de implementação.Brasília: Ministério da Saúde; 2015.

5. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Orientações para a coleta e análise de dados antropométricos em serviços de saúde: Norma Técnica do Sistema de Vigilância Alimentar e Nutricional - SISVAN. Brasília: Ministério da Saúde; 2011.

6. Brasil. Vigilância Alimentar e Nutricional - SISVAN: orientações básicas para a coleta, processamento, análise de dados e informação em serviços de saúde. Brasília: Ministério da Saúde; 2004.

7. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Marco de referência da vigilância alimentar e nutricional na atenção básica. Brasília: Ministério da Saúde; 2015.

8. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Orientações para avaliação de marcadores de consumo alimentar na atenção básica. Brasília: Ministério da Saúde; 2015..

9. Brasil. Ministério da Saúde. Guia para a organização da Vigilância Alimentar e Nutricional na Atenção Primária à Saúde. Brasília: Ministério da Saúde; 2022.

10. Coelho LC, Asakura L, Sachs A, Erbert I, Novaes CRL, Gimeno SGA. Sistema de Vigilância Alimentar e Nutricional/SISVAN: conhecendo as práticas alimentares de crianças menores de 24 meses. Ciênc. saúde colet. 2015;20(3):727-738. https://doi.org/10.1590/1413-81232015203.15952014

11. Benvido VV, Dutra AA, Menenguci MAS, Almeida NAV, Rodrigues AH, Cardoso PC. Indicadores de saúde e nutrição de crianças menores de dois anos de idade: uma realidade para a implantação da Estratégia Amamenta e Alimenta Brasil na atenção básica de Governador Valadares-MG. DEMETRA 2019;14(1):e43464. https://doi.org/10.12957/demetra.2019.43464

12. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Departamento de Promoção da Saúde. Situação alimentar e nutricional de crianças na Atenção Primária à Saúde no Brasil. Brasília: Ministério da Saúde; 2022.

13. Gonçalves VSS, Silva SA, Andrade RCS, Spaniol AM, Nilson EAF, Moura IF. Marcadores de consumo alimentar e baixo peso em crianças menores de 6 meses acompanhadas no Sistema de Vigilância Alimentar e Nutricional, Brasil, 2015. Epidemiol. Serv. Saúde 2019;28(2):e2018358. https://doi.org/10.5123/S1679-49742019000200012

14. Secretaria da Saúde do Estado do Paraná. Situação alimentar e nutricional do Estado do Paraná 2012 a 2022. Curitiba; 2024. [Acesso 18 abr 2024]. Disponível em: https://www.aen.pr.gov.br/sites/default/arquivos_restritos/files/documento/2024-04/material_nutricao.pdf

15. Instituto Brasileiro de Geografia e Estatística. Cidades. [Acesso 18 abr 2024]. Disponível em: https://cidades.ibge.gov.br/brasil/pr/guarapuava/panorama

16. Instituto Paranaense de Desenvolvimento Econômico e Social. Caderno Estatístico: Guarapuava; 2024. [Acesso 16 abr 2024]. Disponível em: http://www.ipardes.gov.br/cadernos/MontaCadPdf1.php?Municipio=85000&btOk=ok

17. Secretaria de Saúde. Prefeitura de Guarapuava. Plano municipal de saúde 2022/2025. Guarapuava; 2021. [Acesso 16 abr 2024].Disponível em: https://www.guarapuava.pr.gov.br/wp-content/uploads/2022/03/Plano-Municipal-de-Saude-2022-2025.pdf

18. World Health Organization. Infant and Young Child Feeding: A tool for assessing national practices, policies and programmes. Geneva: WHO; 2003.

19. Antunes JLF, Cardoso MRA. Uso da análise de séries temporais em estudos epidemiológicos. Epidemiol. Serv. Saúde 2015;24(3):565-576. https://doi.org/10.5123/S1679-49742015000300024

20. Atty ATM, Guimarães RM, Andrade CLT. Tendência Temporal da Mortalidade por Câncer de Boca e da Cobertura de Atenção Primária no Estado do Rio de Janeiro. Revista Brasileira de Cancerologia 2022;68(3):e-042082 2022. https://doi.org/10.32635/2176-9745.RBC.2022v68n3.2082

21. Aprelini CMO, Reis EC, Enríquez-Martinez OG, Jesus TR, Molina MCB. Tendência da prevalência do sobrepeso e obesidade no Espírito Santo: estudo ecológico, 2009-2018. Epidemiol. Serv. Saúde 2021;30(3):e2020961. https://doi.org/10.1590/S1679-49742021000300017

22. Brasil. Resolução nº 510, de 07 de abril de 2016. Dispõe sobre as normas aplicáveis a pesquisas em Ciências Humanas e Sociais. Diário Oficial da República Federativa do Brasil, Brasília, DF, 24 maio 2016.

23. Brasil. Ministério da Saúde. Portaria GM/MS N°1.127, de 2 de junho de 2021. Habilita estados, Distrito Federal e municípios ao recebimento de incentivo para estruturação e implementação de ações de alimentação e nutrição, com base na Política Nacional de Alimentação e Nutrição - PNAN, referente ao exercício financeiro de 2021. Diário Oficial da União, Brasília, DF, 2 junho de 2021.

24. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Política Nacional de Alimentação e Nutrição. Brasília: Ministério da Saúde; 2013.

25. Oliveira RC, Felipin LCS, Mariano PP, Vieira VCL, Frez FCV, Rodrigues TFCS et al. Aleitamento materno exclusivo no estado do Paraná em um contexto de pandemia. In: Praxedes MFS. Enfermagem: Investigação científica, ensino e assistência. Atena: Ponta Grossa; 2022. http://doi.org/10.22533/at.ed.9472212072

26. Domingues F, Pinto FS, Pereira VM. Grupo de gestantes na atenção básica: espaço para construção do conhecimento e experiências na gestação. Fac Ciênc Méd Sorocaba.2018; 20(3):150-154. https://doi.org/10.23925/1984-4840.2018v20i3a6

27. Gomes PTT. Práticas alimentares de crianças menores de um ano que compareceram na segunda etapa da campanha nacional de vacinação nos postos de saúde fixos da cidade de Guarapuava-PR em 2004. 2005. Dissertação de Mestrado. Universidade de São Paulo, Escola de Enfermagem de Ribeirão Preto; 2005.

28. Saldan PC, Venancio SI, Saldiva SRDM, Pina JC, Mello DF. Práticas de aleitamento materno de crianças menores de dois anos de idade com base em indicadores da Organização Mundial da Saúde. Rev. Nutr. 2015;28(4):409-420. https://doi.org/10.1590/1415-52732015000400007

29. Universidade Federal do Rio de Janeiro. Aleitamento materno: Prevalência e práticas de aleitamento materno em crianças brasileiras menores de 2 anos Relatório 4: ENANI 2019. Rio de Janeiro: UFRJ; 2021.

30. Souza DS, Anjos CN, Silva GC, Nascimento SL, Santana JM. Padrão de aleitamento materno e estado antropométrico de crianças assistidas na atenção básica à saúde. Revista Brasileira de Saúde Funcional 2021;9(1):14-28. https://doi.org/10.25194/rebrasf.v9i2.1437

31. Amaral S, Basso C. Aleitamento materno e estado nutricional infantil. Disciplinarum Scientia. 2009;10(1):19-30.

32. II Inquérito Nacional sobre Insegurança Alimentar no Contexto da Pandemia da COVID-19 no Brasil [livro eletrônico]: II VIGISAN: relatório final/Rede Brasileira de Pesquisa em Soberania e Segurança Alimentar – PENSSAN. São Paulo: Fundação Friedrich Ebert: Rede PENSSAN; 2022.

Contributors

Albach C participated in the collection, analysis and interpretation of data; writing of the study; and participation in the final review and approval of the manuscript for submission; Santos EF and Negrão NTGX participated in the final review and approval of the manuscript for submission; Melhem ARF participated in the analysis and interpretation of data; and in the final review and approval of the manuscript for submission; Saldan PC participated in the idealization of the study design; in the analysis and interpretation of data; writing of the study; and in the final review and approval of the manuscript for submission.

Conflict of Interest: The authors declare no conflict of interest.

Received: April 18, 2023
Accepted: May 20, 2024