

ORIGINAL ARTICLE

Food consumption in early childhood: contribution to food and nutritional surveillance

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Abstract

Introduction:

Objectives: To analyze food consumption and factors associated with the nutritional status of children aged less than two years old.

Methods: A cross-sectional study with a sample of 344 infants under two years of age and their mothers, followed-up at Family Health Units. The mothers' and infants' sociodemographic and anthropometric variables and the food consumption of these children were assessed with structured questionnaire. The association strength between the dependent and independent variables was assessed by the Odds Ratio, both in the univariate and in the multiple analysis, with a 5% significance level.

Results: The prevalence of inadequate nutritional status was 38.08%. It was observed that 29.09% of the children under six months of age were not offered breast milk exclusively or that it was offered for less than 30 days. Consumption of ultra-processed foods was noticed, mainly industrialized juice in the last month [OR: 1.96, CI: 1.05-3.65], as well as low fruit intake and the habit of eating while watching television in infants older than six months of age. After adjusting for confounding variables, the following remained associated with nutritional status: gestational anemia [OR: 3.58, CI: 1.46-8.77] and maternal work [OR: 0.38, CI: 0.18-0.80].

Conclusion: Inadequate nutritional status, characterized by low or excess weight, was associated with the fact that the mother worked and to gestational anemia. In addition, there was early introduction of ultra-processed food products in the diet of children under 24 months of age, replacing food considered natural and healthy, thus showing inappropriate eating practices in view of the recommendations for the age group.

Keywords: child health, feeding behavior, food consumption, infant nutrition.

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Authors summary

Why was this study done?

The current study was carried out with the objective of contributing to food and nutritional surveillance to provide subsidies for agreeing on the actions and intervention strategies of the Health System with the Municipal management to promote child health, as well as assist in the elaboration of public policies.

What did the researchers do and find?

The researchers investigated socioeconomic, demographic and maternal nutritional status data, as well as the food consumption and nutritional status of children living in a municipality from the South of Minas Gerais. They discovered high prevalence of exclusive breastfeeding and introduction of complementary feeding with presence of fresh and minimally processed food products; such a dietary pattern contributes to children's full growth and development. However, the presence of risk factors for the development of inadequate nutritional status and incorrect introduction of food options stands out, such as early incorporation of sugars and ultra-processed foods.

What do these findings mean?

Studies on this topic can provide predictions for the country's future health indicators, as an adequate and healthy diet in the first thousand days of life will have repercussions throughout life.

INTRODUCTION

The early years of a child's life are considered the most delicate of all the life phases, as these days are marked by high growth speed, intense maturation and establishment of eating habits¹⁻³. Adequate nutrition is considered a fundamental element for the development of human beings, especially during the first years of life^{3,4}.

Current recommendations on healthy infant diet underscore the importance of exclusive breastfeeding (EBF) during the first six months of life and of continued breastfeeding up to two years of age or more⁵. Likewise, adequate introduction of complementary food products from six months onwards is also an undeniable factor for maintenance of the nutritional status, but also in their food preferences during adulthood and for the children's health⁶.

Such situations are essential to ensure healthy growth and development, given that in this age group, nutritional needs are high and food is different in terms of quality when compared to older children^{3,4}. Thus, good or poor eating practices, mainly in early childhood, exert repercussions for a lifetime^{7,8}. Therefore, nutritional and feeding issues deserve special attention during this life period.

Currently, assessing food consumption is an extremely valuable instrument to monitor the analysis of the population's health status, providing subsidies for the development of adequate health policies and programs, directed to specific groups according to risk characterization⁹. Thus, in order to improve the nutrition, health and dietary status of the population, the Food and Nutrition Surveillance System (Sistema de Vigilância Alimentar e Nutricional, SISVAN) allows such analysis of eating habits through its forms, mainly consumption markers^{10,11}.

In this perspective, the conduction of studies about food consumption in the first years of life is justified, as it is at this age that eating habits begin to be established. Therefore, it is an ideal period for educational interventions in eating habits and nutrition aimed at promoting health, healthy development of children, and at understanding the relationship between health and disease in the Primary Health Care context.

Given the above, the objective of this study was to analyze food consumption and the factors associated with the nutritional status of children aged less than two years old.

METHODS

Study design

This is a cross-sectional study.

Study period and locus

The study was conducted from March to October 2019 in Family Health Units (FHUs) located in the municipality of Alfenas, southern Minas Gerais.

Study population and eligibility criteria

The sample consisted of breastfeeding infants of both genders aged less than 24 months old and their respective mothers followed-up by the FHUs. Sample calculation was performed in the OpenEpi® program, resorting to the following formula:

$$n = DEFF \times \frac{Np(1-p)}{\frac{d^2}{1.96^2} \times (N-1) + p \times (1-p)}$$

(N = Population size [for the finite population correction factor or fpc]; p = Hypothetical % frequency of the outcome factor in the population; DEFF = Design Effect for group surveys and d = Confidence limits as % of 100 [absolute +/-%]). We considered the following for the calculation: the mean number of live births living in Alfenas-MG in 2017 (991) and in 2018 (998), 95% confidence interval, 5% sampling error and 50% estimate for the prevalence of the event under study (early weaning, inadequate feeding practices). A 20% addition was established to compensate for possible losses, characterizing a homogeneous sample comprised by 344 children.

The mothers selected to participate were those who voluntarily agreed to take part in the research and signed the Free and Informed Consent Form. The exclusion criteria were as follows: children who did not live with their mothers, as it was them that were responsible for answering the questionnaire; and children who presented some pathology or immobilization that precluded measuring weight and length.

Data collection

Data collection took place on days when care was provided by the Pediatrics area at Basic Health Units and on home visits. The data were collected by applying a semi-structured questionnaire that presented the mother's

sociodemographic and anthropometric variables, and the child's nutritional status, which was characterized based on the anthropometric profile and food consumption markers.

Food consumption analysis was performed using food consumption marker forms for children under two years old proposed by SISVAN, considered as independent variables, most of which elaborated using direct questions (yes/no): total breastfeeding time, consumption of cow milk, water or tea, infant formula, fruit and food with salt for children under six months old, with the exception of the exclusive breastfeeding (EBF) time questions (≤ 1 month, > 1 month and ≤ 5 months and still on EBF).

For those older than six months of age, the following variables were considered: consumption of whole fruit, food with salt, legumes, meat and/or eggs, beans, cereals, cold meats, stuffed biscuits/sweets/treats, instant noodles/snacks/biscuits, sweetened drinks, porridge with milk or milk thickened with flour, eating while watching television the day before the survey, consumption of industrialized juice and soft drink in the last month; and introduction of honey/molasses/sugar/brown sugar and food with salt before six months old; except for the exclusive breastfeeding (EBF) time variable (≤ 1 month, > 1 month and ≤ 5 months, > 5 months)¹².

For this study, the Body Mass Index by Age (BMI/Age) indicator was used to assess nutritional status, based on measures such as weight and length collected according to the methodology proposed by the World Health Organization (WHO) and adopted by the Ministry of Health¹¹. The WHO and the Ministry of Health also recommend using the indicator to screen overweight and obesity in children, due to the ease to obtain the anthropometric measures at a low cost. The anthropometric data collected were analyzed using the WHO Anthro 3.1¹³ program, thus establishing the nutritional diagnosis, expressed in Z score, and compared to the growth standards proposed by the WHO¹⁴.

To assess the mothers' nutritional status, the anthropometric measurements collected included weight and height according to the methodology proposed by the Ministry of Health, using a scale and a stadiometer as instruments, and evaluated by means of the Body Mass Index (BMI) using the cutoff points proposed by the Ministry of Health¹¹. For the BMI/Age indicator, the "underweight", "risk of overweight" and "obesity" categories were grouped into the same category called "inadequate"; and the "eutrophic" classification was categorized as "adequate". For analysis purposes, this variable was used as dependent in this study.

In addition, the independent variables were also selected through a literature review and included according to their possible association with the topic of the current study, as follows: child's age (≤ 6 months old/ > 6 months old); gender of the child (female/male); maternal age (< 20 years old/ > 20 years old); maternal schooling (≤ 8 years/ > 8 years); number of children (≤ 2 / > 2); family income (≤ 2 MWs/ > 2 MWs); government benefit: the "beneficiary of the Bolsa Família program" variable was constructed using a direct question (yes/no); maternal work outside the house (yes/no), gestational anemia (yes/no); mother's nutritional status (adequate/inadequate).

Data analysis

Data distribution normality was analyzed using the Shapiro-Wilk test at 5%. In the descriptive data analysis, frequency distributions, means and standard deviations were estimated for the continuous variables included in the study and frequency distributions were estimated for the categorical variables. The association between the variables was tested by crossing them using the Chi-Square or Fisher's exact tests and by means of the multiple analysis through logistic regression.

Magnitude of the associations was estimated by calculating the unadjusted and adjusted odds ratios (OR), with their respective 95% confidence intervals (95% CI). The variables whose statistical significance was below 20% in the Chi-Square test and those that were identified by the literature as a risk or protective factor for the development of inadequate nutritional status were pre-selected for the regression analysis. The final model consisted in the factors that remained associated with the dependent variable at the 5% significance level. The data were typed into Excel and subsequently analyzed in the Statistical Package for the Social Sciences (SPSS) program, version 20.0.

Ethical and legal aspects of the research

The current research paper was prepared according to Resolution N° 466/12 of the National Health Council/Ministry of Health and approved by the Research Ethics Committee of Universidade Federal de Alfenas – UNIFAL-MG (CAAE: 06262819.4.0000.5142/N° 3,199,539/2019). The mothers who signed the Free and Informed Consent Form (FICF) were offered a complete explanation of the study essence, objectives, methods and procedures used in data collection, in the same way that they were informed about the benefits obtained from this research, in order to obtain participation of their children under 24 months of age in the study on a voluntary basis. In addition to that, the mothers were informed that they could withdraw from the study at any moment.

RESULTS

A total of 344 children were studied and it was verified that the prevalence of inadequate nutritional status in those under two years of age was 38.08%, with 8.72% (30) for low weight and 29.36% (101) for excess weight.

Table 1 presents the univariate analysis of the variables referring to the children's sociodemographic characteristics and to the mothers' socioeconomic, demographic and nutritional characteristics. The occurrence of inadequate nutritional status was statistically associated ($p < 0.05$) with gestational age [OR: 2.02; IC: 1.22-3.34]. The results suggest the fact that the mothers work outside the house as a protective factor [OR: 0.50, IC: 0.32-0.78]. The higher chances for the occurrence of inadequate nutritional status in the mothers with less than eight years of study draw the attention. However, the mothers' nutritional status was not associated with the children's [OR: 1.02, IC: 0.64-1.63]. Thus, despite presenting $p > 0.20$, the "child's age", "income" and "beneficiaries of the Bolsa Família program" variables were included in the multiple analysis, considering the theoretical framework adopted.

Table 1: Characterization and univariate analysis of the sociodemographic profile of the children under two years old and of the socioeconomic, demographic and nutritional variables of the mothers, according to nutritional status. Alfenas, 2019

Variable	Classification of the child's nutritional status						Unadjusted OR	CI (95%) LL – UL	p-value
	Total		Adequate		Inadequate				
	f	%	f	%	f	%			
Child's age									
>6 months old	179	52.03	104	58.1	75	41.9	1.29	0.83 – 2.01	0.249
≤6 months old	165	47.97	109	66.06	56	33.94	1		
Gender									
Female	168	48.84	108	64.29	60	35.71	1.22	0.79 – 1.88	0.377
Male	176	51.16	105	59.66	71	40.34	1		
Mother's age									
≤ 20 years old	37	10.76	21	56.76	16	43.24	1.27	0.64 – 2.54	0.494
> 20 years old	307	89.24	192	62.54	115	37.46	1		
Maternal schooling									
≤ 8 years	95	27.85	47	22.38	48	36.63	1.55	0.97 – 2.46	0.064
≥ 8 years	246	72.15	163	77.62	83	63.35	1		
Number of children									
> 2	67	19.48	38	17.84	29	22.14	1.31	0.76 – 2.25	0.328
≤ 2	277	80.47	175	82.16	102	77.86	1		
Income									
≤ 2 min. wages	169	57.68	100	54.95	69	62.16	1.35	0.83 – 2.18	0.225
> 2 min. wages	124	42.32	82	45.05	42	37.84	1		
Beneficiary of the Bolsa Familia program									
Yes	58	17.11	32	15.09	26	20.47	1.45	0.82 – 2.57	0.203
No	281	82.89	180	84.91	101	79.53	1		
Maternal work									
Yes	170	49.42	119	70	51	30	0.5	0.32 – 0.78	0.002*
No	174	50.58	94	54.02	80	50.58	1		
Gestational anemia									
Yes	82	23.98	40	48.78	42	51.22	2.02	1.22 – 3.34	0.006*
No	260	76.02	171	65.77	89	34.23	1		
Mother's nutritional status									
Inadequate	175	56.45	112	64	63	36	1.02	0.64 – 1.63	0.935
Adequate	135	43.55	87	64.44	48	35.56	1		

Source: Frequency. OR: Odds Ratio. 95% CI: 95% Confidence Interval corresponding to the OR. *Significant at 5% (p<0.05).

In addition, in the univariate analysis, food consumption the previous day was not statistically associated (p>0.05) with occurrence of inadequate nutritional status in children aged less than six months old. It was observed that most of the breastfeeding infants were offered breast milk the day before the interview and that they were still on EBF (63.64%). However, it is noteworthy

that, despite the high prevalence of EBF, there is a large number of infants who were never offered breast milk exclusively or that they received it for less than 30 days (29.09%) (table 2). Although without statistical association at the p<0.20 level, the variable was also included in the multiple model.

Table 2: Characterization and analysis of food consumption the day before the research in children aged less than six months old living in the city of Alfenas – MG, 2019, according to nutritional status

Variable	Classification of the nutritional status						Unadjusted OR	CI (95%) LL – UL	p-value
	Total		Adequate		Inadequate				
	f	%	f	%	f	%			
The child was offered breast milk yesterday									
No	32	19.39	23	71.88	9	28.13	1.09	0.70 – 1.71	0.692
Yes	133	80.61	86	64.66	47	35.34	1		
Age at EBF									
≤30 days old	48	29.09	31	64.58	17	35.42	0.83	0.50 – 1.38	0.47
>31 days old ≤150 days old	8	7.27	8	66.67	4	33.33	0.95	0.52 – 1.74	0.859
>150 days old	68	63.64	68	64.76	37	35.24	1		
Yesterday, the child was offered:									
Cow milk									
Yes	5	3.03	5	100	0	0	0.65	0.58 – 0.73	0.168
No	160	96.97	104	65	56	35	1		
Water or tea									
Yes	31	18.79	22	70.97	9	29.03	0.88	0.44 – 1.77	0.728
No	134	81.21	87	64.93	47	35.07	1		
Infant formula									
Yes	53	32.12	36	67.92	17	32.08	0.76	0.32 – 1.78	0.522
No	112	67.88	73	65.18	39	34.82	1		
Fruit									
Yes	9	5.45	8	88.89	1	11.11	0.23	0.28 – 1.88	0.137
No	156	94.55	101	64.74	55	35.26	1		
Food with salt									
Yes	5	3.03	4	80	1	20	0.47	0.05 – 4.37	0.504
No	160	96.97	105	65.63	55	34.38	1		

Source: Frequency. OR: Odds Ratio. 95% CI: 95% Confidence Interval corresponding to the OR. EBF: Exclusive Breastfeeding. *Significant at 5% (p<0.05).

The univariate analysis showed that not eating whole fruit the day before the survey was statistically associated (p<0.05) with the outcome of inadequate nutritional status in infants aged more than six months old [OR: 9.62, CI: 2.08-44.41] (table 3).

Table 3: Characterization and analysis of food consumption the day before the research in children aged more than six months old living in the city of Alfenas – MG, 2019, according to nutritional status

Variable	Classification of the nutritional status						Unadjusted OR	CI (95%) LL – UL	p-value
	Total		Adequate		Inadequate				
	f	%	f	%	f	%			
The child was offered breast milk yesterday									
No	100	55.87	57	57	43	43	1.09	0.70 – 1.71	0.692
Yes	79	44.13	47	59.5	32	40.51	1		
Age at EBF									
≤30 days old	43	24.57	22	51.2	21	48.84	0.83	0.50 – 1.38	0.47
>31 days old ≤150 days old	46	26.29	26	56.5	20	43.48	0.95	0.52 – 1.74	0.86
> 150 days old	86	49.14	53	61.6	33	38.37	1		

Continuation - Table 3: Characterization and analysis of food consumption the day before the research in children aged more than six months old living in the city of Alfenas – MG, 2019, according to nutritional status

Variable	Classification of the nutritional status						Unadjusted OR	CI (95%) LL – UL	p-value
	Total		Adequate		Inadequate				
	f	%	f	%	f	%			
Yesterday, the child was offered:									
Milk preparations									
>2 bottles	144	80.45	81	56.3	63	43.75	1.49	0.69 – 3.22	0.309
≤2 bottles	35	19.55	23	67.7	12	34.3	1		
Whole fruit									
No	14	7.87	2	14.3	12	87.71	9.62	2.08 – 44.41	0.001*
Yes	164	92.13	101	61.6	63	38.41	1		
Food with salt									
No	4	2.25	2	50	2	50	1.42	0.19 – 10.29	0.73
Yes	174	97.75	102	58.6	72	41.38	1		
Legumes									
No	22	12.99	13	59.1	9	40.91	0.95	0.38 – 2.36	0.92
Yes	157	87.71	91	58	66	42.04	1		
Meat and/or eggs									
No	31	17.32	17	54.8	14	45.16	1.18	0.54 – 2.56	0.686
Yes	148	82.68	87	58.8	61	41.22	1		
Beans									
No	18	10.06	10	55.6	8	44.44	1.12	0.42 – 2.99	0.818
Yes	161	89.94	94	58.4	67	41.61	1		
Cereals									
No	13	7.3	6	46.2	7	53.85	1.71	0.55 – 5.30	0.351
Yes	165	92.7	98	59.4	67	40.61	1		

Source: Frequency. OR: Odds Ratio. 95% CI: 95% Confidence Interval corresponding to the OR. EBF: Exclusive Breastfeeding. *Significant at 5% (p<0.05).

Table 4 shows the results about food consumption of infants over six months of age in the univariate analysis, with higher intake proportions of ultra-processed food products the day before and the last month to the survey, as well as early introduction of other food options; however, there was a significant association (p<0.05) only for consumption of industrialized juice in the last month

[OR:1.96, CI: 1.05-3.65]. In addition, it was noticed that consumption of ultra-processed food products and the habit of eating while watching television was present in approximately 30% of the sample under study. The data also evidenced early incorporation of food products such as honey/sugars and food with salt in part of the sample: 12.36% and 25.99%, respectively.

Table 4. Characterization and analysis of the early incorporation of food products and consumption of ultra-processed food options the day before and the last month before the research in children aged more than six months old living in the city of Alfenas – MG, 2019, according to nutritional status

Variable	Classification of the nutritional status						Unadjusted OR	CI (95%) LL – UL	p-value
	Total		Adequate		Inadequate				
	f	%	f	%	f	%			
Cold meats									
Yes	21	11.73	10	47.6	11	52.38	1.62	0.65 – 4.03	0.3
No	158	88.27	94	59.5	64	40.51	1		
Stuffed Biscuit/Sweets/Treats									

Continuation - Table 4. Characterization and analysis of the early incorporation of food products and consumption of ultra-processed food options the day before and the last month before the research in children aged more than six months old living in the city of Alfenas – MG, 2019, according to nutritional status

Variable	Classification of the nutritional status						Unadjusted OR	CI (95%) LL – UL	p-value
	Total		Adequate		Inadequate				
	f	%	f	%	f	%			
Yes	54	30.34	29	53.7	25	46.3	1.28	0.67 – 2.43	0.458
No	124	69.66	74	59.7	50	40.32	1		
Instant Noodles/Snacks/Cookies									
Yes	46	25.7	26	56.5	20	43.48	1.09	0.55 – 2.15	0.801
No	133	74.3	78	58.7	55	41.35	1		
Sweetened beverages									
Yes	50	27.93	29	58	21	42	1.01	0.52 – 1.95	0.986
No	129	72.07	75	58.1	54	41.86	1		
Eating while watching television									
Yes	57	32.39	31	54.4	26	45.61	1.28	0.68 – 2.43	0.441
No	119	67.61	72	60.5	47	39.5	1		
Porridge with milk or milk thickened with flour									
Yes	38	21.35	24	63.2	14	36.84	0.78	0.37 – 1.63	0.505
No	140	78.65	80	57.1	60	42.86	1		
During the last month, the child was offered:									
Industrial juice									
Yes	66	37.29	32	48.5	34	51.52	1.96	1.05 – 3.65	0.032*
No	111	62.71	72	64.9	39	35.14	1		
Soft drink									
Yes	53	29.78	27	50.9	26	49.06	1.54	0.81 – 2.95	0.187
No	125	70.22	77	61.6	48	38.4	1		
Before 6 months old, the child was offered:									
Honey/Molasses/Sugar/Brown sugar									
Yes	22	12.36	13	59.1	9	40.91	0.94	0.38 – 2.34	0.901
No	156	87.64	90	57.7	66	42.31	1		
Food with salt									
Yes	46	25.99	24	52.2	22	47.83	1.35	0.69 – 2.65	0.384
No	131	74.01	78	59.5	53	40.46	1		

Source: Frequency. OR: Odds Ratio. 95% CI: 95% Confidence Interval corresponding to the OR. *Significant at 5% (p<0.05).

Table 5 presents the variables that remained in the multiple analysis model, after adjusting for children’s age and gender, maternal schooling and, income, beneficiary of the Bolsa Família program, maternal work, gestational anemia and fruit consumption.

Table 5: Final multiple model of the variables associated with inadequate nutritional status in children aged less than 24 months old living in the city of Alfenas – MG, 2019

Variable	Parameter	Standard Error	OR	CI (95%)	p-value
Maternal work	-0.97	0.38	0.38	0.18 – 0.80	0.011
Gestational anemia	1.15	0.41	3.15	1.40 – 7.07	0.005

OR: Odds Ratio. 95% CI: 95% Confidence Interval corresponding to the OR.

DISCUSSION

By conducting this study it was possible to identify that inadequate nutritional status, that is, excess or low weight, was associated with gestational anemia, presence of

mothers in the labor market, consumption of industrialized juice and non-consumption of fruit by children aged more than 6 months old.

Gestational anemia is a nutritional problem in our country, which can exert deleterious effects on the

health of the mother-child dyad, including occurrence of low or excess weight in children, according to the study findings¹⁵. In addition to that, it increases the chances of miscarriage, premature births, bleeding during labor, preeclampsia, hypoxia, low birth weight, newborn anemia and dysfunction in the maternal immune system^{16,17}.

The mothers' presence in the job market was associated as a protection factor for the breastfeeding infants not presenting low or excess weight. There is no consensus in the literature regarding the "maternal work" variable in terms of feeding. Some studies suggest that working mothers have higher schooling levels and, therefore, provide their children with adequate and healthy food, such as higher consumption frequency of vegetables¹⁸, as well as having greater access to resources to promote full cognitive development, which may corroborate the data found in this study^{19,20}.

On the other hand, other studies point out that the time the parents spend away from home favors the search for and consumption of ultra-processed food products, as well as it contributes to early breastfeeding interruption and, therefore, favors early introduction of food options regardless of the processing level^{21,22}.

In the sample under study, 38.08% of the children presented inadequate nutritional status, with 29.36% having been diagnosed excess weight. Such data confirm the nutritional transition that Brazil has been going through in recent decades, with an increasing frequency of excess weight and a reduction in malnutrition. Obesity has been a public health problem in recent years, both in childhood and in adulthood, although it is known that the first years of a child's life are crucial for the occurrence of obesity^{23,24}. This increase in the number of excess weight and obesity cases has resulted from changes in lifestyle, especially due to changes in food consumption and to a greater tendency to sedentary life²⁵.

The current recommendations on infant feeding establish breastfeeding as the appropriate initial practice, which should be exclusive until six months of age and continued until two years old or more, emphasizing that complementary feeding should be initiated at six months of age, preferably offering fresh and minimally processed food products^{1,5,6}. However, the occurrence of dietary inadequacies was remarkable in the population studied and showed an association with inadequate nutritional status.

In this study, non-consumption of fruit was associated with occurrence of inadequate nutritional status. Data found in the literature indicate that the presence of fruit in the diet, as well as consumption of vegetables, is a protective factor against excess weight, as such food options have low calorie and fat contents, as well as a high amount of fiber and micronutrients, which helps with satiety and, consequently, to reduce food intake^{26,27}.

Regarding the food consumption of children aged more than 6 months old, it was found that, in the sample of children older than six months of age, the consumption of ultra-processed food products (UPFs) was present both on the day and in the last month before the survey; however, a significant association was only found with consumption of industrialized juice in the last 30 days and with inadequate nutritional status. Such food options have a high amount of

fat, sugar and sodium, as well as preservatives, dyes and countless food additives, which favors onset of childhood obesity, one of the factors contributing to the emergence of chronic non-communicable diseases, corroborating the findings of this study^{2,28,29}. In addition to that, the literature points out that the UPF offer in early childhood is related to a higher frequency in their consumption, as well as to advertising campaigns linked to food^{30,31} and, in the current study, 30% of the infants ate in front of some type of screen.

These findings corroborate other studies, which showed inadequate dietary patterns converging on early introduction of processed and ultra-processed food products^{2,28}, that is, for a diet rich in energy and poor in vitamins and minerals and, consequently, with an impact on the health of these consumers, especially on their nutritional status, favoring an excessive increase in body fat.

Despite that, in this study it was possible to identify a considerable prevalence of exclusive breastfeeding in the first six months of life, although there was still a percentage of children who were not offered breast milk exclusively during this period. This result suggests disagreement with the recommendations by the Ministry of Health and with what is described in the first step of the Twelve Steps for Healthy Eating, from the Food Guide for Brazilian children under two years of age, which recommends offering only breast milk up to six months of age, without offering water, teas or any other food⁶.

These findings indicate that, despite the increase in the prevalence of breastfeeding during the last years, early weaning is still an important public health problem in Brazil. Therefore, carrying out local diagnoses of the breastfeeding situation is extremely important to support the intervention measures necessary to reduce early weaning and minimize its consequences. This is because the longer the breastfeeding period, the less selective the child will be when introducing food options, especially in relation to vegetables, shown by a study conducted with children exclusively breastfed up to four to five months old, who presented less food selectivity when compared to those who were exclusively breastfed until the first month of life³².

However, the results of this study should be interpreted considering some limitations inherent to the research. The self-reported information and the type of study would be aspects to be considered. The cross-sectional nature of the study does not allow performing cause-effect associations with the data collected. In addition to that, although an association between gestational anemia and nutritional status was found in the paper, the study design did not allow for a deeper investigation of the cutoff points, treatments and tests underwent by the mothers who reported presence of gestational anemia, merely based on a retrospective account of the mothers.

Another limitation would be the data collection instrument, a food consumption markers form, as it seeks to identify the quality of the child's diet, but does not allow quantifying the food servings consumed. However, it is an instrument with easy and fast application which allows analyzing children's food consumption^{9,11}. Such being the case, it is suggested to conduct longitudinal research studies

to understand the variables that interfere in the feeding practice and, consequently, in children's nutritional status.

Nevertheless, the data from this paper are relevant for the current scenario regarding child health in the local context under study: and the research stands out for its representative sample of the children living in the municipality. Thus, this set of results can encourage managers and health professionals to propose food and nutrition surveillance actions and intervention strategies with the objective of promoting child health.

■ CONCLUSION

It is concluded that inadequate nutritional status in children aged less than 24 old is associated with the fact that the mothers work and with occurrence of gestational anemia. In addition, early introduction of ultra-processed food products in the diet of children under 24 months of age was observed, replacing food options considered natural and healthy, thus evidencing inadequate dietary practices in view of the current recommendations by the World Health Organization and the Ministry of Health.

Authors' Contributions:

Ana Clara da Cruz Della Torre wrote the manuscript, participated in data analysis and interpretation, and approved the final version to be submitted. In addition to

that, she was responsible for all the aspects of the paper in ensuring accuracy and integrity of any of its parts. Débora Vasconcelos Bastos Marques wrote the manuscript, participated in data analysis and interpretation, and approved the final version to be submitted. Denismar Alves Nogueira wrote the manuscript, performed the data analysis and interpretation, and approved the final version to be submitted. Tábatia Renata Pereira de Brito wrote the manuscript, participated in data analysis and interpretation, and approved the final version to be submitted. Daniela Braga Lima wrote the manuscript, participated in data analysis and interpretation, and approved the final version to be submitted. In addition to that, she was responsible for all the aspects of the paper in ensuring accuracy and integrity of any of its parts.

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Conflicts of interest

The authors declare no conflicts of interest.

■ REFERENCES

1. Lopes WC, Marques FKS, De Oliveira CF, et al. Infant feeding in the first two years of life. *Rev Paul Pediatr* 2018; 36: 164–170.
2. Silveira, Grayce Laiz Lima; Neves, Lílian Ferreira. Pinho L de. Factors associated with feeding among children attending public schools: in cross-sectional study, Montes Claros, MG. *Rev da Assoc Bras Nutr* 2017; 7894: 20–26.
3. Lima DB, Silva MMS da, Paula HA de A, et al. Feeding in early childhood in Brazil. *Rev Atencao Primaria a Saude* 2012; 15: 336–344.
4. Ribeiro N de M, Pereira AYK, Ozela CM dos S. Developing and validating an educational brochure to promote breastfeeding and the infant's complementary food. *Rev Bras Saude Matern Infant* 2018; 18: 337–347.
5. Victora CG, Barros AJD, França GVA, et al. Amamentação no século 21: epidemiologia, mecanismos, e efeitos ao longo da vida. *Epidemiol Serv Saúde* 2016; 2: 1–24.
6. Brasil. Guia Alimentar para Crianças Brasileiras Menores de 2 anos. Brasília, http://bvsmms.saude.gov.br/bvs/publicacoes/guia_alimentar_crianças_menores_2anos.pdf (2019).
7. Maranhão H de S, Aguiar RC de, Lira DTJ de; et al. Dificuldades Alimentares Em Pré-Escolares, Práticas Alimentares Progressas E Estado Nutricional. *Rev Paul Pediatr* 2017; 36: 45–51.
8. Passanha A, Benício MHD, Venancio SI. Characterization of the food consumption of breastfed infants between six to twelve months of age in the state of São Paulo. *Cienc e Saude Coletiva* 2020; 25: 375–385.
9. Gomes A de A, Pereira RA, Yokoo EM. Caracterização do consumo alimentar de adultos por meio de questionário simplificado: contribuição para os estudos de vigilância alimentar e nutricional. *Cad Saúde Coletiva* 2015; 23: 368–373.
10. Coradi FDB, Bottaro SM, Kirsten VR. Consumo Alimentar De Crianças De Seis a Doze Meses E Perfil Sóciodemográfico Materno. *DEMETRA Aliment Nutr Saúde* 2017; 12: 733–750.
11. Brasil. Orientações para a coleta e análise de dados antropométricos em serviços de saúde: Norma Técnica do Sistema de Vigilância Alimentar e Nutricional - SISVAN / Ministério da Saúde, Secretaria de Atenção à Saúde, Departamento de Atenção Básica. 2011.
12. Brasil. Orientações para avaliação de marcadores de consumo alimentar na atenção básica. Brasília, 2015.

13. World Health Organization - WHO. Who Anthro, <http://www.who.int/childgrowth/software/es/> (2011).
14. World Health Organization. Child Growth Standards: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age.
15. Luiz AA de O, Santos MB, Brito TRP de; et al. Anemia Em Gestantes Atendidas Na Rede Pública De Saúde De Um Município Do Sul De Minas Gerais. *Rev Atenção à Saúde* 2019; 17: 73–80.
16. Campos CAS, Malta MB, Neves PAR, et al. Gestational weight gain, nutritional status and blood pressure in pregnant women. *Rev Saude Publica* 2019; 53: 57.
17. Lopes L, Freitas IR, Maciel MC. Anemia ferropriva / ferropênica em gestantes: uma revisão integrativa de literatura. *Rev Da Univ Val Do Rio Verde* 2015; 442–451.
18. Campagnolo PDB, Da Costa Louzada ML, Silveira EL, et al. Práticas alimentares no primeiro ano de vida e fatores associados em amostra representativa da cidade de Porto Alegre, Rio Grande do Sul. *Rev Nutr* 2012; 25: 431–439.
19. Gross RS, Mendelsohn AL, Fierman AH, et al. Maternal infant feeding behaviors and disparities in early child obesity. *Child Obes* 2014; 10: 145–152.
20. Ribeiro DG, Perosa GB, Padovani FHP. Fatores de risco para o desenvolvimento de crianças atendidas em Unidades de Saúde da Família, ao final do primeiro ano de vida: Aspectos sociodemográficos e de saúde mental materna. *Cienc e Saude Coletiva* 2014; 19: 215–226.
21. McIntosh A, Kubena KS, Tolle G, et al. Determinants of children's use of and time spent in fast-food and full-service restaurants. *J Nutr Educ Behav* 2011; 43: 142–149.
22. Moraes BA, Gonçalves A de C, Strada JKR, et al. Fatores associados à interrupção do aleitamento materno exclusivo em lactentes com até 30 dias. *Rev Gauch Enferm* 2017; 37: e20160044.
23. Nascimento VG, da Silva JPC, Ferreira PC, et al. Aleitamento materno, introdução precoce de leite não materno e excesso de peso na idade pré-escolar. *Rev Paul Pediatr* 2016; 34: 454–459.
24. Vilchis-Gil J, Galván-Portillo M, Klünder-Klünder M, et al. Food habits, physical activities and sedentary lifestyles of eutrophic and obese school children: A case-control study. *BMC Public Health* 2015; 15: 1–8.
25. Camargos ACR, Azevedo BNS, Silva D da, et al. Prevalência de sobrepeso e de obesidade no primeiro ano de vida nas Estratégias Saúde da Família. *Cad Saúde Coletiva* 2019; 27: 32–38.
26. Santos C, Pereira Rocha D, Casteluber LW, et al. Introdução de frutas e verduras na alimentação complementar de lactentes em Montes Claros, Minas Gerais. *Arch latinoam nutr* 2020; 70: 1–7.
27. Machado RHV, Feferbaum R, Leone C. Consumo de frutas no Brasil e prevalência de obesidade TT - Fruit intake and obesity Fruit and vegetables consumption and obesity in Brazil. *Rev bras crescimento desenvolv hum* 2016; 26: 243–52.
28. Longo-Silva G, Silveira JAC, Menezes RCE de; et al. Age at introduction of ultra processed food among preschool children attending day care centers. *J Pediatr - Versão em Port* 2017; 93: 508–516.
29. Garcia C, Brum JP D, Elâine D, et al. Consumo alimentar: um estudo sobre crianças com sobrepeso e obesidade do Espaço Mamãe Criança de Vera Cruz / RS Food consumption: a study with overweight and obese children at the Espaço Mamãe Criança in the city of Vera Cruz / RS. *Cinergis* 2014; 15: 195–200.
30. Giesta JM, Zoche E, Corrêa R da S, et al. Associated factors with early introduction of ultra-processed foods in feeding of children under two years old. *Cienc e Saude Coletiva* 2019; 24: 2387–2397.
31. Ceccatto D, Spinelli RB, Zanardo VPS, et al. A influência da mídia no consumo alimentar infantil: uma revisão da literatura. *Rev Perspect* 2018; 42: 141–149.
32. Specht IO, Rohde JF, Olsen NJ, et al. Duration of exclusive breastfeeding may be related to eating behaviour and dietary intake in obesity prone normal weight young children. *PLoS One* 2018; 13: 1–11.

Resumo

Introdução:

Objetivos: analisar o consumo alimentar e os fatores associados ao estado nutricional de crianças menores de dois anos de vida.

Método: Estudo de corte transversal realizado com uma amostra de 344 lactentes menores de dois anos de idade e suas respectivas mães, acompanhadas em Unidades de Saúde da Família. As variáveis sociodemográficas, antropométrica das mães e dos lactentes e o consumo alimentar dessas crianças foram avaliadas por meio de questionário estruturado. A força de associação entre as variáveis dependente e as independentes foi avaliada pelo odds ratio, tanto na análise univariada quanto na múltipla, com nível de significância de 5%.

Resultados: A prevalência do estado nutricional inadequado foi de 38,08%. Observou-se que 29,09% das crianças menores de seis meses de idade não chegaram a receber leite materno de forma exclusiva ou o tempo de oferta foi inferior a 30 dias. Notou-se o consumo de alimentos ultraprocessados, principalmente, do suco industrializado no último mês [OR:1,96, IC 95%: 1,05-3,65], baixa ingestão de frutas e o hábito de comer assistindo televisão nos lactentes maiores de seis meses. Após ajuste para variáveis de confusão, permaneceram associadas ao estado nutricional: anemia gestacional [OR: 3,58 IC: 1,46-8,77] e trabalho materno [OR, 0,38, IC 95%: 0,18-0,80].

Conclusão: A presença do estado nutricional inadequado, caracterizado pelo baixo ou excesso de peso, associou-se ao fato de a mãe trabalhar e à anemia gestacional. Ademais, constatou-se a participação precoce de alimentos ultraprocessados na alimentação das crianças menores de 24 meses de idade, substituindo alimentos considerados naturais e saudáveis, evidenciando assim práticas alimentares inadequadas frente às recomendações para a faixa etária.

Palavras-chave: comportamento alimentar; consumo alimentar; nutrição do lactente; saúde da criança.

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