

ORIGINAL ARTICLE

Food consumption of children from zero to 23 months in a Brazilian municipality

Consumo alimentar de crianças de zero a 23 meses em um município brasileiro

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KEYWORDS

Nursing
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ABSTRACT

Objective: to identify the frequency of food consumption in children aged zero to 23 months.

Methods: this analytical research with a quantitative approach was conducted with 911 mothers/guardians of children aged under 23 months. In data collection, sociodemographic information, and information on the frequency of food consumption of the child in the last 24 hours were obtained through a questionnaire of food consumption markers from SISVAN.

Results: more than two-thirds of the participants reported having offered inappropriate foods for the child's age the day before. Among children under six months of age, inadequate food consumption had a prevalence of 38.3%. In the age group from 6 to 23 months, this frequency of consumption was 88.4%. The most inappropriate foods consumed by children under six months of age were water/tea, fruit, and salty foods. Between the ages of six and 23 months, the consumption of non-breast milk, sugary drinks, stuffed biscuits, sweets, and candies predominated.

Conclusion: the consumption of inappropriate foods for age was highly prevalent, especially in children above six months old.

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PALAVRAS-CHAVE

Enfermagem
Nutrição da criança
Saúde da criança

RESUMO

Objetivo: identificar a frequência do consumo alimentar de crianças de zero a 23 meses.

Métodos: realizou-se uma pesquisa analítica, de abordagem quantitativa com 911 mães/responsáveis de crianças menores de 23 meses. Na coleta de dados foram obtidas informações sociodemográficas e sobre a frequência do consumo alimentar da criança nas últimas 24 h por meio de um questionário de marcadores do consumo alimentar do SISVAN.

Resultados: mais de dois terços dos participantes relataram ter oferecido alimentos inadequados para idade da criança no dia anterior. Entre os menores de seis meses o consumo alimentar inadequado apresentou prevalência de 38,3%. Na faixa etária de seis a 23 meses essa frequência de consumo foi de 88,4%. Os alimentos inadequados mais consumidos pelos menores de seis meses foram à água/chá, fruta e comida de sal. Na idade entre seis e 23 meses predominou o consumo de leite que não o do peito, bebidas açucaradas, biscoito recheado, doces e guloseimas.

Conclusão: o consumo de alimentos inadequados para idade apresentou alta prevalência neste estudo, principalmente entre as crianças acima de seis meses.

INTRODUCTION

Adequate nutrition in early childhood is essential for child growth and development and the consolidation of healthy food preferences¹. According to the World Health Organization (WHO), exclusive breastfeeding (EBF) should be carried out up to 6 months of life, and from that period onward, complementary feeding begins².

Considering that the child initially presents physiological and immunological immaturity³, the dietary transition before the sixth month of life causes harm to the baby's health. The occurrence of symptoms such as diarrhea, resulting from the early introduction of food, favors the state of malnutrition in an inefficient immune response and makes the child susceptible to infections, contributing to infant mortality⁴.

The early introduction of foods also contributes to weight gain⁵, which can predict childhood obesity. Data from the Atlas of Childhood Obesity in Brazil published in 2019 show that, among children under two years of age, 11% were overweight and 7.9% obese⁶. According to the World Atlas of Obesity, in 2030, Brazil will hold the fifth position in the ranking among countries with the highest number of overweight children and adolescents⁷.

More recently, The State of the World's Children 2019: Children, Food and Nutrition reports that one in three children under the age of five is malnourished or overweight. The report also shows worrying data regarding the food transition period, indicating that approximately 45% of children between 6 months and 2 years old do not consume fruits and vegetables, and more than 50% do not eat eggs, dairy products, fish or meat, a habit that worsens as the child grows and is increasingly exposed to processed and ultra-processed products⁸.

Studies that seek to investigate the dietary pattern in childhood are critical, as they make it possible to identify factors that interfere with child nutrition, making it possible to plan actions compatible with the reality experienced in different regions⁹. Notably, inadequate food consumption in childhood is directly associated with a high risk of overweight and chronic non-communicable diseases (NCDs) in adulthood, a severe public health problem¹⁰.

It is important to emphasize that primary health

care plays an essential role in disseminating information about child nutrition¹². Awareness actions and guidance on the benefits of breastfeeding and adequate food introduction, and the impacts that infant feeding has on the baby's health must be carried out from the prenatal period^{11,12}.

Given the challenging scenario involving the promotion of healthy eating in early childhood, this study aimed to identify the frequency of food consumption of children aged zero to 23 months in a Brazilian municipality and its association with the sociodemographic characteristics of the children's mothers/guardians.

METHODS

This is an exploratory, analytical, cross-sectional study with a quantitative approach, conducted between April and May 2019 in the city of Registro, located in Vale do Ribeira, São Paulo, Brazil. This municipality has an estimated population of 56,322 inhabitants¹³, 18 Family Health Strategies (ESF), and 100% population covered by the Primary Care assistance¹⁴. The study population consisted of mothers/guardians of children aged zero to 23 months assisted by the municipality's Primary Care.

The municipality's ESFs are distributed in three administrative districts, totaling 1,158 children aged zero to 23 months under follow-up. The sample's calculation was performed considering a confidence interval of 95% and a significance level of 5%, which resulted in 215 in District I, 172 in District II, 188 in District III, totaling 557 kids.

All mothers/guardians whose children were followed up in the municipality's ESFs were included in the study. Those who were not at home at the time of data collection or incorrectly filled out questionnaires were excluded. The selection of participants occurred at home or during consultations at the ESF, consecutively and with a goal of at least reaching the calculated sample size. In the end, the rate of respondents was 78.67% (n = 911).

A sociodemographic questionnaire was used for data collection, with relevant information on age, ethnicity, marital status, education, employment relationship, family income, housing, number of

children, guidelines, and professionals who provide information about the child's nutrition during pregnancy and in lactation, and interruption of exclusive breastfeeding. Additionally, the food consumption marker Food and Nutrition Surveillance System (SISVAN) was used to assess the child's food intake on the previous day².

The SISVAN form includes variables that make it possible to identify food consumption in children under 6 months old, from 6 to 23 months old, and over 2 years old or more. To analyze the food consumption of children aged zero to 23 months, a questionnaire adapted according to the SISVAN form was adopted to classify the frequency of food consumption as adequate and inappropriate according to age group. The classification was conducted following the guidelines for assessing food consumption markers in primary care.

For children under 6 months of age, the consumption of breast milk and infant formula was considered adequate, and the consumption of porridge, water/tea, cow's milk, fruit juice, fruit, salty foods, and other foods/beverages was inappropriate. In the age group between 6 and 23 months, the consumption of breast milk, fruits, salty foods, yogurt, vegetables, orange vegetables or fruits or dark green leaves, leafy vegetables, meat, liver, beans, cereals, and tubers (rice, potatoes, yam, cassava, flour or pasta (not instantaneous)) was considered adequate. The consumption of milk other than breast milk, hamburgers or sausages, sugary drinks, instant noodles, stuffed biscuits, sweets, or candies was considered inadequate.

In the classification of food consumption, the type of food (mentioned above), consistency, and frequency of supply were considered. Thus, children aged between 6 months and 6 months and 29 days were classified as adequate food consumption when at least two fruits and one salty food with a pasty consistency were offered, and inadequate consumption of other foods or altered consistency and frequency. For children aged between 7 and 23 months and 29 days, the consumption of at least two fruits and two salty meals with a mashed or normal consistency (in pieces) was considered adequate. The consumption of ultra-processed foods, such as hamburgers, sausages, sugary drinks, sweets, among others, was inadequate².

The questionnaires were previously presented to the teams in each district when they all received training on the application methods and meaning of the items included. The questionnaires were applied in a single moment by the study researchers or community health agents during the routine activities of the ESFs. At the time of data collection, mothers/guardians were asked to answer the questionnaire. However, in cases where the participant had difficulties, we opted for heterofilling.

Data analysis was performed using the Statistical Package for Social Sciences (SPSS) software, version 20.0. In the descriptive statistical analysis, the absolute and relative frequency was calculated. The association between sociodemographic characteristics and food consumption of children aged zero to 23 months was established using the chi-square test (χ^2), with an analysis of residuals adjusted for the location of significant values. In the inferential statistics, the value

of $p < 0.05$ was considered the significance limit.

The study was approved by the Research Ethics Committee of the Union of Institutions of Services, Teaching and Research Ltd., (CAAE 80055117.5.0000.5490, approval nr. 2410.951), with all steps being conducted following the principles of CNS Resolution 466/12 of the Declaration of Helsinki and Principles of the Singapore Statement on Research Integrity. All participants included in the study signed the Informed Consent Form.

RESULTS

The final sample of this study consisted of 911 mothers/guardians of children aged zero to 23 months; 30.7% of the children were under 6 months of age, 69.3% were aged between 6 and 23 months, and most children were male (55.8%). Regarding the characteristics of the participants, the age group above 20 years old (84.5%), white (51.8%), having a partner (77.8%), complete high school (60.3%), having two to four children (54.3%), without an employment relationship (51.3%), with family income above two minimum wages (43.0%) and owning their house (55.1%) predominated (Table 1).

Almost all participants reported having received guidance on nutrition during prenatal care and after the child's birth (87.2%), with the guidance being given more frequently by the nurse (58.1%) followed by the pediatrician (47.6%), family doctor (27.07%), community agent (23.4%), nutritionist (8.2%) and dentist (2.5%). When asked about breastfeeding, 28.5% responded that they stopped exclusive EBF before the child reached 6 months of life (Table 1).

The association analyses revealed that mothers/guardians in the maternal age group between 15 and 20 years old, having an informal employment relationship, and having their own house were associated with inadequate food consumption. Also, the interruption of exclusive EBF before 6 months of life was associated with inadequate food supply (Table 1).

Table 2 shows the results regarding the foods offered to the child the day before. It is observed that in the age group between zero and 6 months, the most consumed foods were breast milk (85.0%), infant formula (34.3%), and water/tea (26.4%). In the age group between 6 and 23 months, consumption of salty foods (93.8%), beans (87.5%), and rice, potatoes, yam, cassava, flour, or non-instant noodles (84.9%) predominated.

Regarding the frequency of food consumption, 70.9% of children received foods that were unsuitable for their age, and in the age group from zero to 6 months, the prevalence was 38.3%, and between 6 and 23 months, it was 88.4% (Figure 1).

Figure 2 shows the frequency of the most consumed inappropriate foods according to age group. At ages between zero and 6 months, the consumption of water/tea (26.4%), followed by fruit (10.0%) and salty foods (9.6%), were the most inappropriate foods consumed. Between 6 and 23 months, consumption of non-breast milk (66.9%), sugary drinks and stuffed biscuits (39.9%), sweets, and candies (34.1%) were the most prevalent foods.

Table 1 – Association between sociodemographic characteristics of mothers/guardians and food consumption of children aged zero to 23 months. Registro/SP, 2019 (N = 911).

Sociodemographic characterization of mothers/guardians	Child food consumption				χ^2 p value
	Adequate n = 265 (29.1%)		Inadequate n = 646 (70.9%)		
	n	%	n	%	
Age group					
15 to 20 years	30	21.3	111	78.7	$\chi^2 = 4.936$ $p = 0.026$
≥ 20 years	235	30.5	535	69.5	
Ethnicity					
White	152	32.2	320	67.8	$\chi^2 = 7.625$ $p = 0.054$
Black	15	27.8	39	72.2	
Mixed	98	26.1	278	73.9	
Yellow	0	0.0	9	100.0	
Marital Status					
With a partner	217	30.6	492	69.4	$\chi^2 = 3.570$ $p = 0.059$
Without a partner	48	23.8	154	76.2	
Schooling					
Technical / higher education	49	34.8	92	65.2	$\chi^2 = 2.625$ $p = 0.269$
High school	153	27.9	396	72.1	
Elementary school	63	28.5	158	71.5	
Employment relationship					
No contract	158	33.8	309	66.2	$\chi^2 = 15.986$ $p < 0.001$
Formal	70	28.7	174	71.3	
Informal	37	18.5	163	81.5	
Family income (*minimum wage)					
≤ 1 minimum wage	129	27.6	339	72.4	$\chi^2 = 3.414$ $p = 0.181$
≥ 2 minimum wages	125	31.9	267	68.1	
Not declared	11	21.6	40	78.4	
Home ownership					
Yes	132	26.3	370	73.7	$\chi^2 = 4.232$ $p = 0.040$
No	133	32.5	276	67.5	
Number of children					
1	105	28.5	263	71.5	$\chi^2 = 4.274$ $p = 0.118$
2 - 4	152	30.7	343	69.3	
≥ 5	8	16.7	40	83.3	
Received guidance on food					
Yes	223	28.1	571	71.9	$\chi^2 = 3.017$ $p = 0.082$
No	42	35.9	75	64.1	
Interruption of exclusive breastfeeding					
Yes	27	10.4	233	89.6	$\chi^2 = 61.709$ $p < 0.001$
No	238	36,6	413	63.4	

*Minimum wage R\$1,045.00. χ^2 Chi-square test.

DISCUSSION

The food consumption of children under 2 years of age identified in this study revealed that most children received inadequate foods for their age, a situation that intensified mainly in the age group between 6 and 23 months, in which almost three-quarters of children were fed inappropriately. Knowing the frequency of children's food consumption in the stage of growth and development is necessary for

planning actions that can strengthen food and nutrition education, promote healthy eating and, consequently, avoid harm in future life.

Early childhood is a period marked by rapid growth and neurodevelopment, which requires increased energy intake and micronutrients to meet the nutritional needs critical for the child's growth and development¹⁵. Additionally, adequate nutrition at this age is essential for promoting and maintaining health, which reflects on the individual's health in adulthood¹⁶.

Table 2 – Food consumed by children from zero to 23 months, Registro/SP, 2019 (N = 911). Values in n (%).

Food*	Food consumption		
	Yes	No	Do not know
0 to 6 months (n = 280)			
Breast milk	238 (85.0)	41 (14.6)	1 (0.4)
Porridge	15 (5.4)	259 (92.5)	6 (2.1)
Water / tea	74 (26.4)	205 (73.2)	1 (0.4)
Cow’s milk	11 (3.9)	268 (95.7)	1 (0.4)
Infant formula	96 (34.3)	184 (65.7)	---
Fruit juice	25 (8.9)	255 (91.1)	---
Fruit	28 (10.0)	251 (89.6)	1 (0.4)
Salty food	27 (9.6)	253 (90.4)	---
Other foods / drinks	9 (3.2)	271 (96.8)	---
6 to 23 months (n = 631)			
Breast milk	379 (60.1)	249 (39.5)	3 (0.5)
Whole fruit, in pieces or mashed	488 (77.3)	128 (20.3)	15 (2.4)
Salty food	592 (93.8)	26 (4.1)	13 (2.1)
Milk other than breast milk	422 (66.9)	206 (32.6)	3 (0.5)
Porridge with milk	165 (26.1)	460 (72.9)	6 (1.0)
Yogurt	317 (50.2)	307 (48.7)	7 (1.1)
Vegetables	440 (69.7)	180 (28.5)	11 (1.7)
Orange vegetable or fruit or green leaves	408 (64.7)	211 (33.4)	12 (1.9)
Leafy vegetable	250 (39.6)	368 (58.3)	13 (2.1)
Meat	517 (81.9)	111 (17.6)	3 (0.5)
Liver	99 (15.7)	521 (82.6)	11 (1.7)
Beans	552 (87.5)	74 (11.7)	5 (0.8)
Rice, potato, yam, cassava, flou ror non-instant noodles	536 (84.9)	87 (13.8)	8 (1.3)
Hamburger and/or sausages	122 (19.3)	503 (79.7)	6 (1.0)
Sugary drinks	252 (39.9)	375 (59.4)	4 (0.6)
Instant noodles, chips or crackers	205 (32.5)	423 (67.0)	3 (0.5)
Stuffed biscuit, sweets or candies	215 (34.1)	413 (65.5)	3 (0.5)

*There may be more than one food consumed by the child.

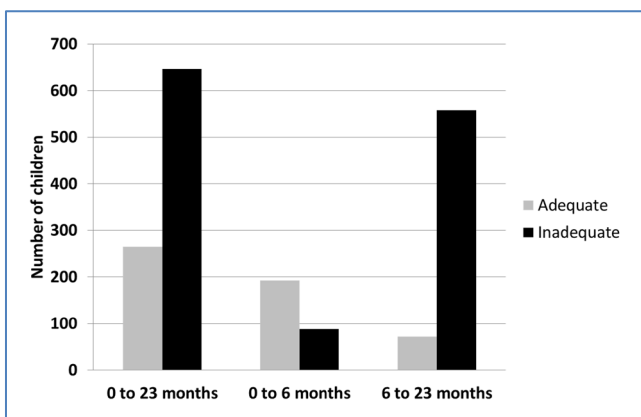


Figure 1 – Absolute frequency of general food consumption, in the age groups from zero to 6 months and from 6 to 23 months.

Ensuring nutritional needs in the first years of life, whose growth and neuroplasticity rates are at their peak, reduces infant mortality and health problems throughout life^{15,17}, directly impacting health services' costs.

To promote universal access to healthy and nutritious food, as well as combating nutritional problems in Brazilian children, the National Food and Nutrition Policy (PNAN) and the Brazilian National School Feeding Program (PNAE) are comprehensive public policies, with government intervention in social and food spheres, which, guided by the principle of food sovereignty, contribute to Food and Nutritional Security (SAN), growth and development, learning and the promotion of healthy eating habits¹⁸⁻²⁰.

Note that social vulnerability, which is characterized by socioeconomic aspects or harmful experiences to biological, behavioral, and mental health

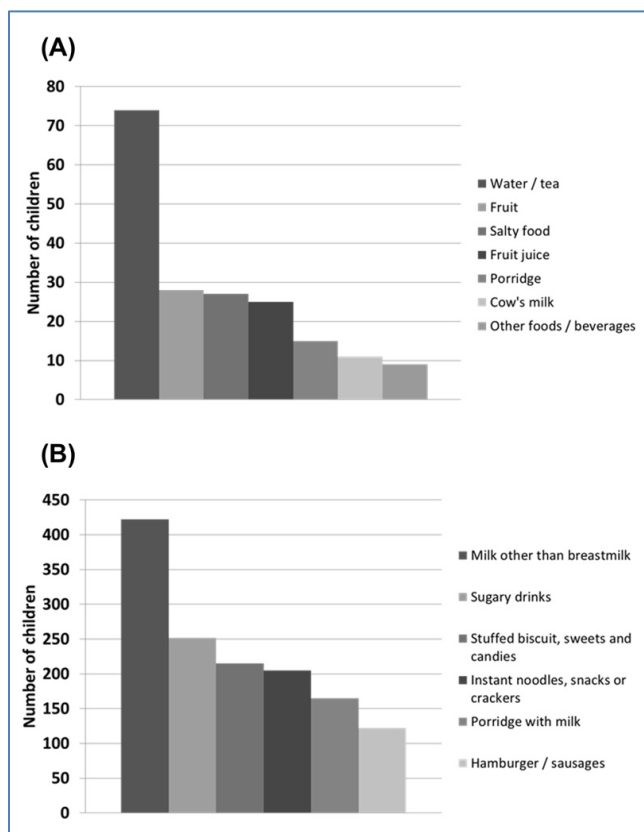


Figure 2 – Absolute frequency of inappropriate foods consumed. (A) Children from zero to six months; (B) Children from 6 to 23 months. **Note:** There may be more than one food consumed by the child.

factors²¹, is considered a risk factor for infant feeding²². In this study, the population investigated in Vale do Ribeira, a region with the lowest Human Development Index (HDI) (0.63) in the state of São Paulo²³, also has a high illiteracy rate and a majority use of Primary Care²⁴.

The child's eating habits are determined by the availability or food choices made within the family and, subsequently, they are influenced by other circles, such as the school environment²⁵. Thus, maternal variables also influence child food consumption. In this study, inadequate food consumption in children aged zero to 23 months was associated with mothers aged 15 to 20 years. A similar result was previously described, in which children of mothers under the age of 20 showed greater adherence to an unhealthy eating pattern, consisting of soft drinks, industrialized juices, cookies/simple cakes, foods rich in simple sugars, among others²⁶. Therefore, it can be inferred that the profile of adequate food supply for the child is related to a better discernment of parents or guardians and access to information and guidance regarding the management and assertive choices about infant feeding.

The mother's working conditions are variables associated with the frequency of food consumption. Maternal employability can satisfactorily influence the child's growth due to increased family income, making it possible to acquire healthy food and access to basic sanitation and health services²⁷. In this study, it was identified that being self-employed was associated with

inadequate food consumption. Interestingly, other studies identified that "mothers with an employment relationship" increased the probability of children being overweight than unemployed mothers or who worked at home^{28,29}. A possible explanation for this finding is that, although the mother's labor activity increases the possibility of shopping for food and having access to information, the employment relationship also reduces the time spent with the children and the time to prepare healthy meals. Additionally, acting as a self-employed person affects the need to maintain work activities, limiting the time to plan and prepare adequate meals for the child.

Furthermore, this study verified the association of inadequate food consumption with homeownership. This association can be attributed to chance since there seems to be no causal relationship between these two parameters in this study.

Children exclusively breastfed for up to 6 months of life were associated with offering adequate food after the exclusivity period. Note that, in opposition to this, the early interruption of breastfeeding increases the chances of consuming inappropriate foods for the child's age^{30,31}. Exclusive breastfeeding in the first 6 months of life is a WHO recommendation, and its benefits to health and the promotion of infant development are widely discussed, as well as the prevention of mortality, lower risk of food allergies, and reduced risk of infections caused by contaminants present in poorly sanitized foods^{32,33}.

The earliest introduced foods were water/tea, fruits, salty foods, porridge with milk, cow's milk, and other foods/drinks. It is observed in another study that the foods with liquid consistency predominantly inserted early in the children's diet were water/tea and cow's milk⁴. According to the Dietary Guidelines for Brazilian children under 2 years of age³³, the introduction of water and teas before 6 months of life is contraindicated as it reduces breast milk intake, which can result in caloric deficit³⁴. Furthermore, the early introduction of these liquids reduces the number of feeds and consequently reduces the times of sucking, which is considered one of the external stimuli (in addition to sight, crying, and smell) for the production of milk².

Among the inappropriate foods in the diet of children under one year of age, cow's milk stands out, especially considered an allergen in this age group³². In terms of quantity and quality of nutrients, cow's milk has a high amount of protein, high mineral content (such as sodium, chloride, potassium, and phosphorus), and reduced number of carbohydrates, essential fatty acids, vitamins, and other components necessary for child protection and development². Notably, younger children have physiological and immunological immaturity, contributing to the increased probability of developing respiratory and gastrointestinal tract infections in the first year of life³. Linked to this, early exposure to heterologous proteins is associated with an increased risk of developing type 1 diabetes and allergic diseases such as asthma².

Inadequate consumption of cow's milk and offering sugary drinks stuffed biscuits, sweets and candies, instant noodles, savory snacks or biscuits and porridge with milk was also observed among children

aged 6 to 23 months. From 6 months of life onward, the child's diet must be complemented with healthy foods, prepared with ingredients that are part of the family's food consumption, but meet the children's nutritional quality and quantity. Despite this recommendation, studies show an increase in inappropriate eating practices, mainly characterized by the high consumption of cookies and stuffed sweets, instant noodles, soft drinks, among other ultra-processed and high-energy foods³⁵⁻³⁷. Cultural aspects strongly influence this transition to inadequate food consumption, but it is also linked to sociodemographic characteristics^{34,37}.

Moreover, the introduction of ultra-processed foods rich in sugars and fats, with the interruption of breastfeeding, is a factor that can favor infectious processes, allergic diseases, and nutritional disorders, to the detriment of substances present in these foods that irritate the gastrointestinal mucosa and hinder the absorption of nutrients^{2,33}. Evidently, in addition to contributing to the development of allergic and infectious diseases, such as nutritional deficits, the introduction of ultra-processed foods rich in simple carbohydrates is associated with overweight and obesity in childhood².

Finally, it is noteworthy that in this study, food consumption was not assessed at specific intervals; only the child's age was considered as below 6 months and

between 6 and 23 months. Thus, milk consumption other than breast milk was classified as inadequate for all children aged over 6 months. Regarding the study's limitations, we can mention the impossibility of establishing causal relationships, as this is a cross-sectional study.

CONCLUSION

The results of this study demonstrate that food consumption of children aged zero to 23 months in a municipality in Vale do Ribeira was primarily inadequate, especially in the age group between 6 and 23 months, in which the consumption of milk other than breast milk, sugary drinks, stuffed biscuits, sweets, and candies were more predominant. Before 6 months, the early introduction of water/tea, fruit, and salty foods were predominant. These results raise concerns about inappropriate food consumption and its consequences on growth and development, such as the risks for childhood obesity, nutrient deficiencies, and greater chances of chronic diseases in adulthood. Thus, health services, especially primary care, should strengthen healthy and safe eating actions, considering local characteristics and current public health policies.

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 Writing of the manuscript: TGSS, ALTS
 Critical revision of the article: TGSS, GAT, ALTS
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