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## Food practices in children from zero to two years old admitted to a university hospital of southern Brazil

### *Prticas alimentares em crian as de zero a dois anos internadas em hospital universitrio do sul do Brasil*

#### Abstract

**Objective:** To identify and describe the eating practices of children from zero to two years of age admitted to a university hospital in Porto Alegre-RS. **Methods:** The dietary practices of 261 children were identified by an instrument composed of questions that analyze attributes, components and markers of complementary feeding. The variables were expressed as percentage and absolute value, mean and standard deviation or median and interquartile range. **Results:** Exclusive breastfeeding up to six months was present in 25.3% of the sample, with a median duration of 45 days, and the introduction of complementary feeding was started at an appropriate time (six to seven months) in 57%. Among children who had already started complementary feeding through fruit porridge or main meal (n= 128), the median age of introduction was 5 (4-6) months. Regarding adequacy, food sources of vitamin A and iron were present in 83.6% of the children, and 62.5% consumed all food groups. Consistency of food was adequate in 52.3%. The consumption of ultra-processed foods was present in the diet of 60.2% of the children. **Conclusions:** Low prevalence of exclusive breastfeeding, early introduction of complementary feeding and high frequency of ultra-processed foods were observed. The identified improper eating

practices can compromise the health of the child, and it is important to take actions to promote breastfeeding and the adequate introduction of complementary feeding.

**Keywords:** Breast Feeding. Feeding. Complementary Feeding.

### **Resumo**

**Objetivo:** Identificar e descrever as práticas alimentares de crianças de zero a dois anos de vida internadas em um hospital universitário de Porto Alegre-RS. **Métodos:** Identificaram-se as práticas alimentares de 261 crianças, por instrumento composto por questões que analisam atributos, componentes e marcadores da alimentação complementar. As variáveis foram expressas em percentual e valor absoluto, média e desvio padrão ou mediana e intervalo interquartil. **Resultados:** O aleitamento materno exclusivo até os seis meses esteve presente em 25,3% da amostra, com mediana de duração de 45 dias, e a introdução da alimentação complementar foi iniciada em tempo adequado (seis a sete meses) em 57%. Dentre as crianças que já haviam iniciado a alimentação complementar através da papa de fruta ou refeição principal (n = 128), a mediana de idade de introdução foi de 5 (4-6) meses. Em relação à adequação, alimentos fonte de vitamina A e ferro estiveram presentes em 83,6% das crianças, e 62,5% consumiam todos os grupos alimentares. A consistência da alimentação estava adequada em 52,3%. O consumo de alimentos ultraprocessados estava presente na alimentação de 60,2% das crianças. **Conclusões:** Foram observadas baixa prevalência de aleitamento materno exclusivo, introdução precoce da alimentação complementar e alta frequência de consumo de alimentos ultraprocessados. As práticas alimentares inadequadas identificadas podem comprometer a saúde da criança, sendo importante realizar ações para a promoção do aleitamento materno e da introdução adequada da alimentação complementar.

**Palavras-chave:** Aleitamento materno. Alimentação Complementar. Alimentação.

## INTRODUCTION

In the early years of life, there is accelerated growth and great achievements in the child's development process. During this time, she develops skills to chew and digest food, advancing self-control of the food intake process to achieve adult eating patterns.<sup>1</sup> Eating practices in the first two years of life are determinant of the formation of eating habits in early childhood, which, in turn, affect health and nutrition throughout life,<sup>2,3</sup> and may have consequences in the future, including excess weight and the development of chronic non-communicable diseases.<sup>4</sup>

According to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), the safest, most effective and most complete way to achieve a child's proper growth and development is to ensure exclusive breastfeeding (EBF) until the sixth month of life, without offering water, teas or other food.<sup>5</sup> This is the smartest strategy of bonding, affection, protection and nutrition for children and it contributes to reducing infant morbimortality, offering enormous protection against deaths from various infections, especially in the first months of a child's life. It is suitable for the renal and digestive immaturity of the newborn, being easily digested and absorbed, resulting in the utilization of all nutrients. EBF decreases the incidence of cramps, vomiting and food intolerances, being a "personalized" and irreplaceable food for children.<sup>2,6</sup>

According to UNICEF, the worldwide breastfeeding rate in the first hour of life is of 44%, of EBF in children under six months is of 39% and 49% of continued breastfeeding up to two years of age.<sup>7</sup> In Brazil, the weaning process occurs early in the first weeks or months of life,<sup>1</sup> and the median EBF is around 54.11 days. Data from the II Survey on Breastfeeding Prevalence in the Brazilian Capitals and Federal District (II PPAM) show the reality about the feeding practices of children up to 24 months of age: about 70% breastfed in the first hour of life; early food introduction occurred in 13.8% of children, who in the first month consumed water, teas and other milk; and about a quarter of children between the ages of three and six months already consumed the main porridge and fruits.<sup>8</sup> The average prevalence of EBF found in a meta-analysis of Brazilian epidemiological studies was 25% and a median duration of 55.4 days.<sup>9</sup> In a study comparing breastfeeding duration in four population-based birth cohorts in the city of Pelotas,<sup>10</sup> the prevalence of breastfeeding at 12 months increased from 16% to 41% over the period of 33 years, and the prevalence of exclusive breastfeeding at 3 months increased from 7% in 1993 to 45% in 2015. Prevalence of breastfeeding at 6 months was 0.5% in 1993, 6.5% in 2004 and 14.5% in 2015.

After six months of life, the child is ready to start complementary feeding, which should occur adequately, healthily and in sufficient quantity to ensure its proper development. Meals

are similar to those of the rest of the family after 12 months, and breastfeeding should be continued up to two years or more.<sup>11-13</sup> However, the Brazilian population increasingly consumes ultra-processed foods, introduced earlier and earlier, with a high consumption of coffee, soda and especially cookies and/or snacks among children aged 9-12 months.<sup>8</sup>

Bortolini and collaborators<sup>3</sup> observed that 21.4% of children aged six to 59 months consumed sweets, 46.3% cookies, 8.5% snacks and 22.1% soft drinks. Regarding healthier foods, 44.6% of children consumed fruits daily; 12.7% leafy greens; 21.8% vegetables and 24.6% meats. The results indicate low frequency of consumption of foods important for growth, such as leafy vegetables, fruits and meats, and high frequency of consumption of ultra-processed foods, such as cookies, sweets, soft drinks and snacks.

Given the importance of adequate eating practices for the formation of the child's eating habits, especially in the first two years of life, the aim of this study is to describe the breastfeeding and complementary feeding practices of children aged zero to two years in a university hospital from Porto Alegre-RS.

## METHODS

A retrospective cross-sectional study, part of a study entitled "Relationship between dietary practices and sociodemographic factors with clinical and nutritional outcomes in children from zero to two years of age admitted to a university hospital in Porto Alegre", conducted in two inpatient clinical-surgical units and in the pediatric emergency of a university hospital in Porto Alegre-RS, Brazil. This is a convenience sample consisting of 261 children aged zero to 24 months hospitalized for acute complications (gastroenteritis, urinary tract infections and/or elective surgical situations such as hypospadias, herniorrhaphy, orchidopexy). Were excluded from the study children unaccompanied by their mother; in use of prolonged enteral nutrition therapy and parenteral; who have some chronic complication that may interfere with food, such as neurological and genetic diseases, allergies and/or food intolerances; whose mothers were under 18 years of age, due to the absence of the child's legal guardian to sign the consent form; and those in whom breastfeeding is contraindicated, such as HIV-positive mothers and in antineoplastic treatment.

The questionnaire was administered within the first 48 hours after admission, so that the answers were reliable to the household habits and not influenced by the food offered by the hospital. Data collection was performed by nutritionists or academics qualified for the application of the instrument, which contained information on age, gender, education and

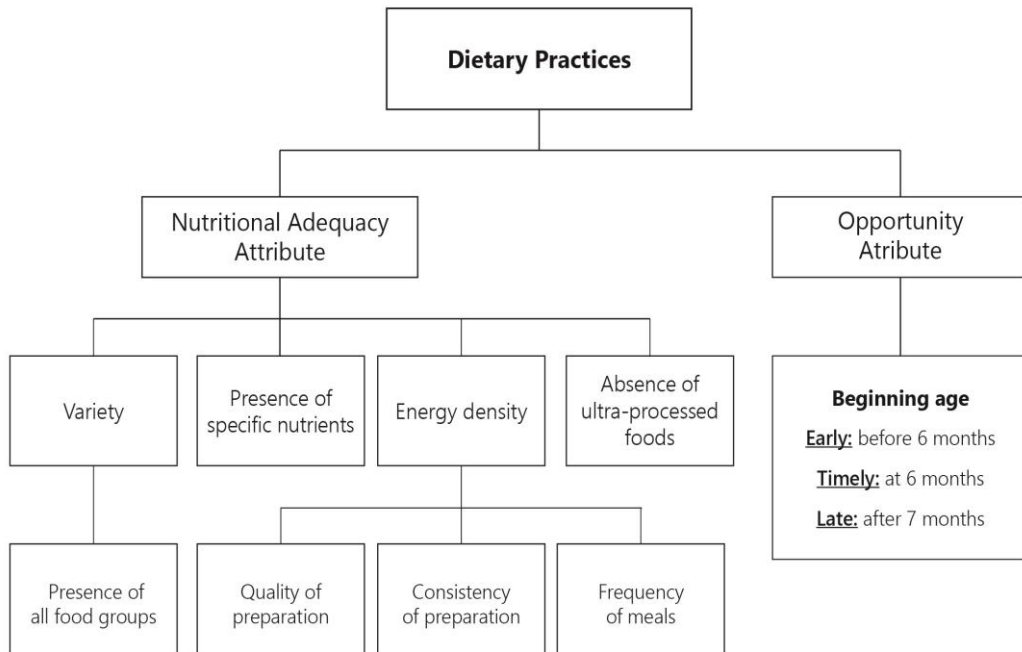
maternal occupation, as well as marital status, per capita household income, socioeconomic classification (A-B, C and D-E) through the Associação Brasileira de Empresas de Pesquisa (Brazilian Association of Research Companies - ABEP) criteria, housing conditions, use of tobacco or other drugs, age of the child, frequency and access to health services.<sup>14</sup> After evaluation of the inclusion criteria, the mothers were oriented about the study objectives and invited to participate. Data collection took place between January 2017 and April 2018.

To assess dietary practices, which covered questions about breastfeeding, formula and cow's milk consumption, intake of solid foods such as fruits and main porridge, as well as consumption of processed and ultra-processed foods, the "Questionnaire for evaluation of food practices in children under two years of age"<sup>11</sup> was used. This is constituted by questions that analyze the quality of the diet considering the main attributes, components and markers of complementary feeding, besides the presence or not of exclusive breastfeeding up until six months or more. The questions were adapted for our region (removing *pequi* and *buriti*, which are not part of the southern region's eating habits).

The indicators of opportunity and food adequacy were considered. The opportunity to introduce complementary feeding was defined as early when started before six months; timely if started between six and seven months; and late when started from the child's seven months of age. Nutritional adequacy was identified through the following components: presence, in the diet, of specific nutrients necessary for full growth and child development (vitamin A and iron); variety of foods offered; energy density of the food; and preparation and absence of ultra-processed food products. Appropriate variety was defined by the presence of all food groups in complementary feeding; the energy density, by consistency of the preparations for the child's age, being considered the pasty consistency for children from six months of age; and at 12 months, the same consistency of family food. The absence of ultra-processed food products was considered a component of the nutritional adequacy of complementary feeding.

Figure 1 represents the flowchart model used for the assessment of eating practices, adapted from Oliveira.<sup>11</sup> The adaptation represented the removal of the "safety" attribute, as it refers to food preparation safety issues, a component that could not be assessed at the time of hospitalization.

**Figura 1.** Modelo de Avaliação de Práticas Alimentares, adaptado de Oliveira.<sup>11</sup>



For the classification of the current nutritional status, the WHO reference standard was used,<sup>15</sup> being considered the cut-off points recommended by the Food and Nutrition Surveillance System (SISVAN).<sup>16</sup> For weight/age, the cut-off points were: <-2 z-score (EZ), low weight for age; between -2 and +2 EZ, eutrophy; and > +2 EZ, high weight for age. For height/age, the cut-off points were: < -2 EZ, short stature for age; and > -2 EZ, age-appropriate height. For weight/height, the cut-off points were: < -2 EZ, thinness (includes thinness and accentuated thinness); between -2 and +2 EZ, eutrophy; and >+2 EZ, excess of weight (includes overweight and obesity). For preterm infants (< 37 weeks), gestational age was corrected and the data were analyzed by probable date of birth corresponding to gestational age of 40 weeks. To assess the nutritional status of these children, the W/A reference was used, considering the corrected age.

The analyses were performed using the Statistical Package for Social Sciences Program (SPSS), version 20.0. Categorical variables were expressed as proportions and absolute value; the symmetric continuous variables, on average and standard deviation; and the non-symmetric ones, in median and interquartile range of the 25th and 75th percentiles.

This study was approved by the Research Ethics Committee of the Hospital de Clínicas de Porto Alegre-RS, under protocol number 17/0030. The parents or guardians of the children were informed about the research objectives and signed the Informed Consent Form (ICF).

## RESULTS

The sample consisted of 261 pairs of mothers and children, with their main characteristics presented in table 1. The average maternal age was 26.7 years, and the average education was 8.8 years. The median age of the children was 4.26 (2-9.2) months, whereas 60.2% (157) were younger than six months. The average gestational age was of 38.1 weeks ( $\pm$  2.5), and three children were classified as extreme premature. Social class C represented 62.8% of the sample. Regarding nutritional status, were considered eutrophic 87.3% (n= 228) of the children according to W/A, and 57.5% (n= 150), according to W/H.

Regarding feeding practices, 80.5% (n= 210) of the children received breast milk in the first hours of life and 60.9% (n= 159) still received exclusive or complementary breast milk. Among non-exclusively breastfed children, 90.3% (n= 176) received infant formula from the start, with a median age of introduction of 13.5 (1-47.5) days. In children who received follow-up infant formula, the average age of introduction was 180 days. The median age of introduction of cow's milk in children under one year of age was of 5 (3-5) months, and 21.6% (n= 47) of children up to one year had received cow's milk.

**Table 1.** Social, maternal, gestational characteristics and nutritional classification of a sample of children aged zero to two years old admitted to a university hospital in Porto Alegre-RS. (n= 261)

Variables	Average (SD)
Maternal Age (years)	26.7 (6.5)
Mother's years of education	8.8 (2.3)
Gestational age	38.1 (2.5)
Weight at birth (kg)	3.1 (596.6)
	Median (IR)
Age of the child (months)	4.3 (2 – 9.2)
Number of pregnancies	2 (1 – 3)
	% (n)

**Table 1.** Social, maternal, gestational characteristics and nutritional classification of a sample of children aged zero to two years old admitted to a university hospital in Porto Alegre-RS. (n= 261) (continues)

Variables	Average (SD)
<i>Maternal marital status</i>	
With companion	78.2 (204)
<i>Social class</i>	
A – B	17.2 (45)
C	62.8 (164)
D – E	19.9 (52)
<i>Classification GA</i>	
Pre-term	20.3 (53)
To term	79.3 (207)
<i>Classification W/A</i>	
Eutrophy	87.3 (228)
Low weight for age	10.0 (26)
High weight for age	2.7 (7)
<i>Classification H/A</i>	
Age-appropriate height	82.8 (216)
Short stature for age	16.5 (43)
<i>Classification W/H</i>	
Eutrophy	57.5 (150)
Thinness	12.6 (33)
Excess of weight	29.9 (78)

Note: GA: Gestational age, W/A: Weight for age, H/A: Height for age, W/H: Weight for height

Table 2 presents the dietary practices through the attributes “opportunity” and “adequacy” of complementary feeding. For exclusive breastfeeding, the entire sample was considered (n= 261). For complementary feeding, only the children who had already started it (n= 128; consumption of fruit porridge or main meal) were considered, with a median age of introduction equal to 5 (4-6) months. Regarding opportunity, exclusive breastfeeding up to six months was present in 25.3% (n= 66) of the sample, with a median duration of 45 (15-90) days, and the age



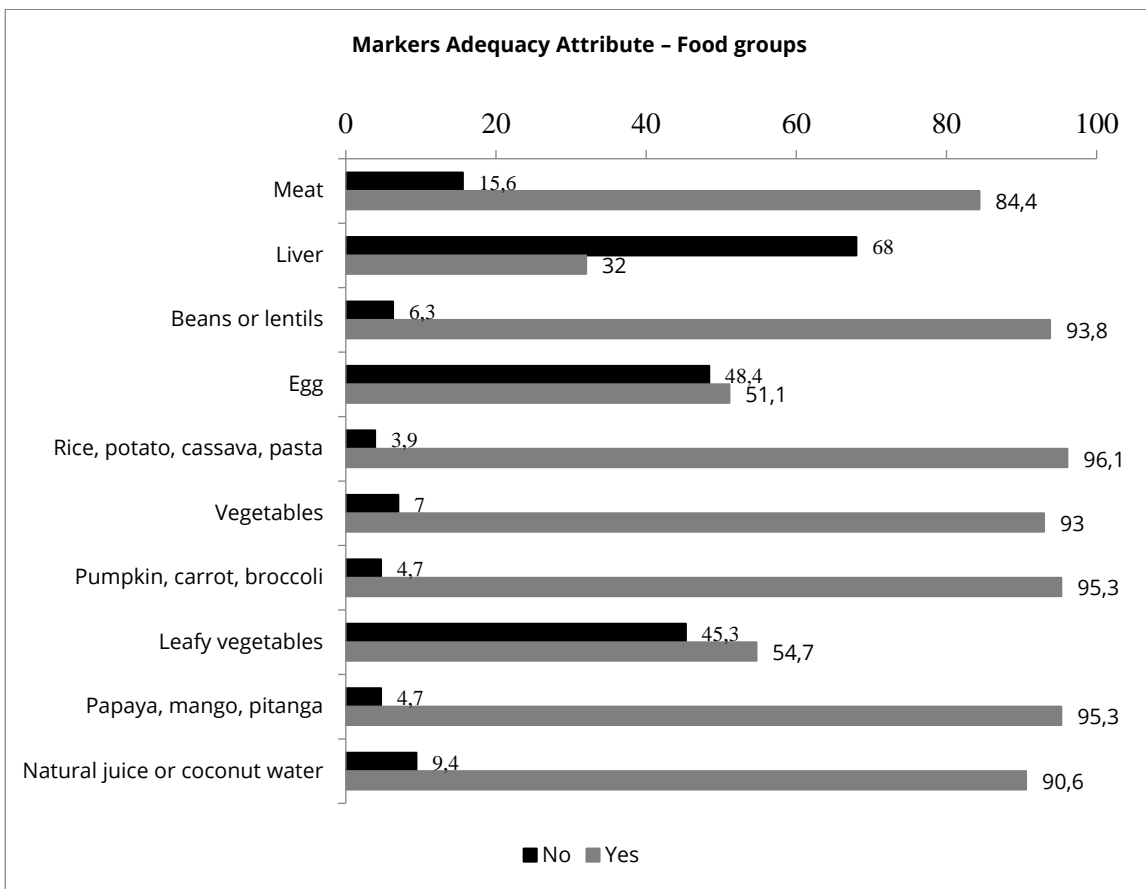
of introduction of complementary feeding was six to seven months in 57% (n= 73) of the sample. Among children who had already started complementary feeding, 94.5% (n= 121) consumed foods source of vitamin A; 93% (n= 119), foods source of iron; and the presence of all food groups occurred for 62.5% (n= 80) of the children. Paste-like and liquid foods occurred in 47.7% (n= 61) of the children and the consumption of ultra-processed foods was present in 60% (n= 77) of the children who had already started complementary feeding.

**Table 2.** Evaluation of the “opportunity” and “adequacy” attributes of a sample of children aged zero to two years old admitted to a university hospital in Porto Alegre-RS (n=261).

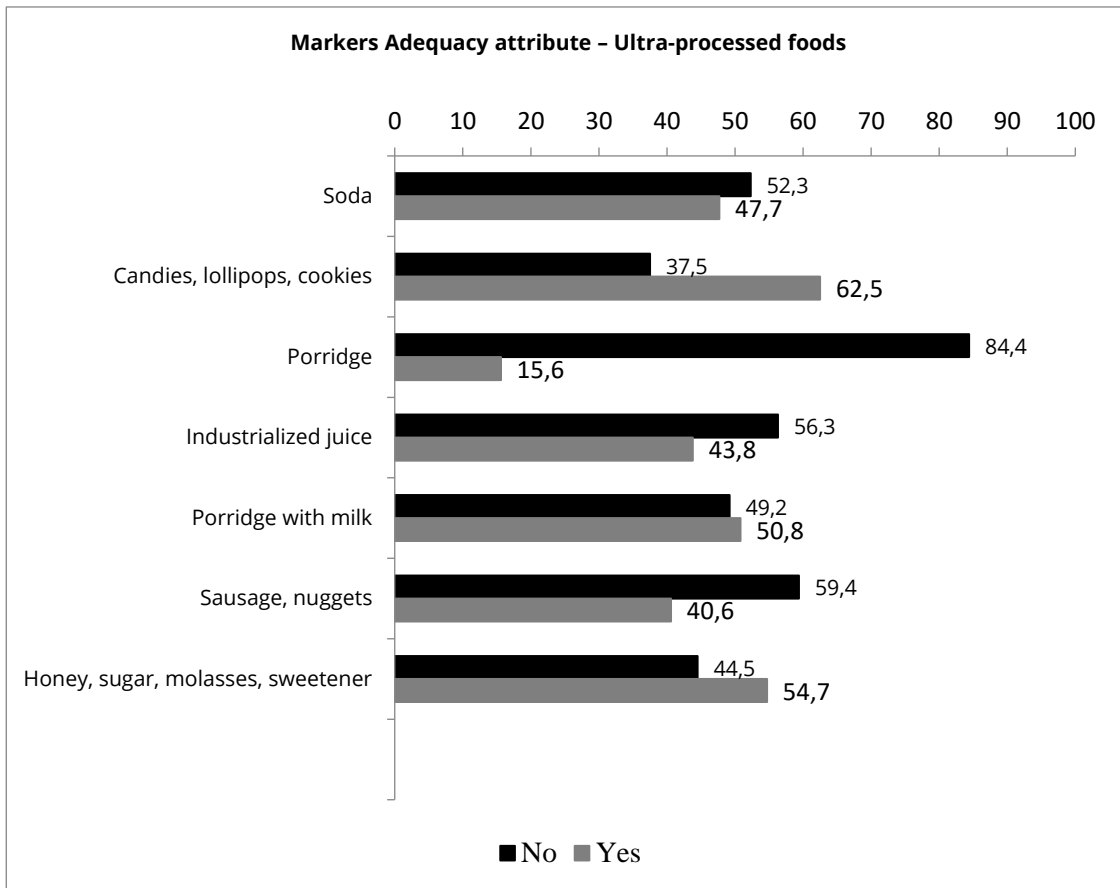
OPPORTUNITY ATTRIBUTE	%	N
<i>Exclusive breastfeeding up to six months</i>		
Yes	25.3	66
Total		261
<i>Introduction of complementary feeding</i>		
Adequate	57.0	73
Early	39.1	50
Late	3.9	5
Total		128
ADEQUACY ATTRIBUTE		
<i>Presence of vitamin A</i>		
Yes	94.5	121
Total		128
<i>Presence of iron</i>		
Yes	93.0	119
Total		128
<i>Presence of all food groups</i>		
Yes	62.5	80
Total		128
<i>Adequate food consistency</i>		
Yes	52.3	67
Total		128
<i>Consumption of ultra-processed foods</i>		
Yes	60.2	77
Total		128

In figure 2 are the foods representative of the consumption of vitamin A and iron and related to variety. It is observed the consumption of fruits, vegetables, legumes, meats, among other foods that represent the different food groups, characterizing the variety in food consumption among children who have already started complementary feeding. Of the foods presented, the group that represent sources of iron are meats, liver, beans/lentils and eggs; and the foods that represent vitamin A are pumpkin/carrot/broccoli, leafy vegetables, papaya/mango/pitanga. Vegetables and the rice/potato/cassava/pasta group represent, along with the former, the variety of food groups. Figure 3 shows the consumption of ultra-processed foods (UPA). The main group of foods consumed by children is composed of candies, lollipops and cookies..

**Figure 2.** Percentage of food consumption representing the attribute “adequacy” and “variety” of a sample of children aged zero to two years old admitted to a university hospital in Porto Alegre-RS. (n= 128)



**Figure 3.** Percentage of consumption of ultra-processed foods representative of the attribute “adequacy” of a sample of children aged zero to two years admitted to a university hospital in Porto Alegre-RS. (n= 128)



## DISCUSSION

This study aimed to describe the eating practices of children from zero to two years old, having been observed low prevalence of exclusive breastfeeding, early introduction of cow's milk, inadequate complementary feeding consistency and high prevalence in the consumption of ultra-processed foods.

Eating practices in children from zero to two years old are still far from ideal. EBF in the first six months of life is not a reality for most children, and follow-up formulas and cow's milk are introduced early. Most of the children studied received cow's milk at five months, representing high protein and sodium intake and low iron consumption for this age group. Data from the II PPAM show that the duration of EBF was of 1.8 months, and complementary BF was

11.2 months, showing longer EBF time than our study data. It also showed that 41% of the children under six months were on EBF.<sup>8</sup> Data from the 2016 SISVAN<sup>17</sup> show that in Porto Alegre-RS, 56.8% received EBF in the first six months. In 2017, in Rio Grande do Sul-RS, 47% were on EBF; less than in 2016, when EBF occurred in 53% of the children in RS.

The results of our study show lower EBF rates and lower average weaning than government research, showing the vulnerability of the population studied in relation to the risks of interruption of breastfeeding. The same was demonstrated by Giesta et al.,<sup>18</sup> where 57.1% of the children under six months of age were in BF and only 25% in EBF. Among children older than six months, 49.3% were in BF and only 5.4% received EBF up to six months of age. Schincaglia<sup>19</sup> observed a low prevalence of EBF, being 47.1% at 30 days of life, 22.3% in the fourth month and only 4.7% in the sixth month of life. As a consequence of this process, she found a high percentage of introduction of other foods in the fourth month of life, besides BF: water (54.1%), teas (31.5%), other milks (18.0%) and juices. (11.5%).

In the study of Bortolini et al.,<sup>20</sup> based on secondary data from the 2006/7 National Demographic and Health Survey (NDHS), 91.8% of the children under six months of age and 61.5% of children aged six to 12 months received breast milk. Non-maternal milk was consumed by 40.1% among children under six months and by 77.1% among children aged six to 12 months. Among those who received other milks, cow's milk was consumed by 62.4% of children under six months and by 74.6% of children between six and 12 months. The frequency of infant formula consumption was of 23% in children under six months of age and 9.8% between six and 12 months. These results show high consumption of milks other than breast milk, introduced early, cow milk being the most common. In the cohort study by Maciel et al.,<sup>21</sup> the percentage of children who were in EBF in the first month of life was 65.2%, and in the sixth month of life, the proportion of partially breastfed infants was 72.6%.

In the present study, among the factors that may be related to the interruption of BF are low maternal education and low socioeconomic status. In a meta-analysis of Brazilian epidemiological studies<sup>9</sup>, it was observed that factors related to the newborn, such as low birth weight, female gender and the use of pacifiers were the main exposure factors responsible for the increased occurrence of EBF interruption. Regarding exposure factors related to the mother, maternal age below twenty years, low education, primiparity, postpartum maternal work and low family income contributed significantly to the interruption of EBF. The lower level of maternal education and lower monthly family income were also associated with the high prevalence of introducing foods not recommended in the first year of life, such as sweet/salty crackers, petit

suisse cheese and gelatin, in a study conducted with children from the Southern region of Brazil.<sup>22</sup>

We know that early introduction of cow's milk, in addition to offering excessive amounts of sodium, potassium chloride and phosphorus, is associated with a higher risk of anemia. The Sociedade Brasileira de Pediatria (Brazilian Society of Pediatrics) does not recommend its consumption by children under one year of age, as it has insufficient amounts of carbohydrates, essential fatty acids, vitamins and minerals for this age group.<sup>19,20</sup> The practice of exclusive breastfeeding up to six months of age and supplemented to at least two years of age should be encouraged, while the provision of other milk for children should be discouraged. This behavior has numerous health benefits for children and mothers, besides presenting low cost to families. In the impossibility of breastfeeding, cow's milk is not recommended before one year of age. However, the infant formula, a recommended substitute for these situations, is far from the economic reality of most of the Brazilian population.<sup>20</sup>

Regarding the introduction of complementary feeding, the study showed that 39% of children received food early. Maciel et al.<sup>21</sup> found that at the sixth month of life, food introduction was inadequate, being the most frequent carbohydrate foods and the least offered were meats, beans, vegetables and fruits being more frequent. According to II PPAM 2009,<sup>8</sup> 20.7% of children between the ages of three and six months were already eating their main meal and 24.4% were eating fruits. In the study by Lopes et al.,<sup>23</sup> at three months of life, 56.8% of the children already received water; 15.5%, natural juice and infant formula; and 10.6%, cow's milk (10.6%).

In the present study, markers referring to the "adequacy" attribute of complementary feeding showed that it is varied and that the majority of the sample eats all food groups and foods that are source of vitamin A and iron. According to Bortolini et al.,<sup>3</sup> 12.7% of children aged six to 59 months consumed leafy vegetables daily; 21.8%, vegetables; 44.6%, fruits; and 24.6%, meats. The frequency of beans and rice intake was of 66.2% and 77.4%, respectively. Regarding the "consistency" marker, 52.3% of children consumed meals of adequate consistency, showing that most of them received liquefied porridge when starting complementary feeding and did not progress adequately in consistency over the months. According to WHO/PAHO,<sup>24</sup> the consistency and variety of foods should be gradually increased as the child grows, adapting to the needs and abilities of the baby.

The marker referring to the attribute "adequacy" brings a worrying reality, in which more than half of the children studied consume UPF, including sugary drinks and treats. In the study by Giesta et al.,<sup>18</sup> the most consumed foods among children before the age of two were crackers (65.7%), gelatin (62.3%) and petit suisse cheese (58.3%). High UPF consumption also appears in

the data of II PPAM,<sup>8</sup> in which the prevalence of crackers/snack foods (71.7%), soft drinks (11.6%) and coffee (8.7%) among children aged 9-12 months show the contribution of these high energy density foods and low nutritional content. Other studies also show high consumption of sweets, crackers, snacks, soda and instant noodles before the age of one.<sup>3,23,24</sup>

The results of the present study, confirmed by several others, are worrying. The intrauterine period and the first two years of life represent a period sensitive to metabolic and nutritional factors, which may have short and long term consequences on the individual's health. Unhealthy childhood eating practices based on ingestion of UPF high in sugar, sodium and fat, have a negative impact on children's health, offering inadequate micronutrient intake and risk for excess of weight and chronic noncommunicable diseases.

Intense socioeconomic changes have a major impact on the families' ability to maintain adequate nutrition. Faced with this scenario, the biggest challenge for health professionals in supporting breastfeeding and adequate and healthy complementary feeding is to overcome their practice, transmitting not only technical knowledge, but mostly presenting skills and attitudes to receive doubts, concerns, difficulties of the mothers/caregivers and their families, which provide availability and perception to propose possible actions to the context of each family.<sup>18,25-27</sup>

## CONCLUSION

We emphasize that this study had as its strong point the use of a current instrument, bringing the conceptual model presented to analyze the eating practices of a population with high indexes of vulnerability. It is noteworthy that this work used still preliminary data.

The results suggest inadequate feeding practices for the age group studied, represented by low rates of exclusive breastfeeding, early introduction of complementary feeding and expressive consumption of ultra-processed foods. Studies that identify the factors involved with the observed eating practices may help in the public feeding policies in childhood.

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