



Early introduction of complementary foods in infants under six months: a case study from Rio Verde, Brazil

Raíssa de Melo Matos FERREIRA¹, Daiane Costa dos SANTOS², Lidiane Bernardes Faria VILELA³,
Tátilla Lima de OLIVEIRA³, Mariana Buranelo EGEA^{4*} 

Abstract

Exclusive maternal breastfeeding is recommended until the infant is six months old, with the subsequent introduction of food gradually. We investigated the prevalence of early complementary feeding in the first six months of life in a medium-sized city in the Midwest region of Brazil (Rio Verde, GO, Brazil). Of the 564 infants under six months of age, 81.2% of infants were breastfed in the last 24 hours, wherein 21.5% were exclusively breastfed, 15.9% received a complementary milk form, and 43.8% received another type of milk. When questioned if the infant had been introduced to complementary feeding at any point since birth, 49.3% of parents or guardians replied in the affirmative, of which 41.8% of infants received water, 21.5% received tea, and 12.1% were given natural fruit juice or coconut water. There was a positive correlation between the introduction of water or foods other than breast milk and the highest level of parental or guardian's education. Our results demonstrate a persisting need to improve public policy programs that encourage breastfeeding.

Keywords: human milk; breastfeeding; breastmilk.

Practical Application: The objective of this research was to demonstrate how the early introduction of food occurs with infants younger than 6 months. In this case, it is important that health professionals work together with families with food and nutrition education programs where doubts about why the age of 6 months is a milestone for food introduction and why it should be respected are clarified.

1 Introduction

Early childhood is characterized by the age group of zero to eight years of life. During this period, an individual's motor, cognitive, emotional, and linguistic development is very important (World Health Organization, 2020). It is essential to take care of infants' development through nutrition, and a balanced diet in early childhood is fundamental for their proper growth and development.

Breastfeeding practices are categorized into two broad categories: exclusive breastfeeding and complementary feeding. The literature is consistent in recommending exclusive feeding for infants for the first six months with breast milk or infant formula. Meanwhile, complementary feeding is how much other foods are added to the infant's diet. Although the ideal moment for the introduction to complementary feeding remains uncertain among the population and culturally, it is generally carried out between 4 and 6 months or when the child shows signs of readiness. Signs of readiness include moments when the infant is able to sit up alone without support (due to improved muscle control of the head and neck), hold toys accurately and bring them towards the mouth, the birth of the first teeth, and the maturation of intestinal and kidney function (Bickell et al., 2018; Harrison et al., 2017).

Exclusive breastfeeding provides the necessary nutrients, antibodies, and other fundamental substances to infants (Mazo-

Tomé & Suárez-Rodríguez, 2018), thereby preventing malnutrition and being overweight (Specht et al., 2018). According to the guidelines recommended by the World Health Organization (WHO), exclusive breastfeeding is required for the first 6 months after birth. To enable this, multidisciplinary teams must be duly qualified to provide pregnant women and mothers with adequate and accessible information. Furthermore, they must encourage and support breastfeeding starting from the point of prenatal care to ensure it will continue even after the mother is discharged from the hospital (Sattari et al., 2019).

Despite programs and public policies aimed at disseminating the guidelines and scientifically accurate information among the population, there persists a lot of unverified information and beliefs that negatively hinder the practice of breastfeeding. One such belief is that breast milk alone is insufficient to meet the nutritional needs of an infant. With the addition of sociocultural pressure for the introduction of water and other foods (Tampah-Naah et al., 2019), such interferences result in the early introduction of complementary feeding, which can damage the health of infants. The inclusion of solid foods is associated with a decrease in breastfeeding duration and has a detrimental interaction with important nutrients from breastmilk such as iron and zinc (Yu et al., 2019).

Received 06 June, 2022

Accepted 22 Aug., 2022

¹Programa de Pós-graduação em Saúde e Nutrição, Universidade Federal de Ouro Preto – UFOP, Ouro Preto, MG, Brasil

²Instituto de Patologia Tropical e Saúde Pública, Universidade Federal de Goiás – UFG, Goiânia, GO, Brasil

³Universidade de Rio Verde – UniRV, Rio Verde, GO, Brasil

⁴Instituto Federal de Educação, Ciência e Tecnologia Goiano, Rio Verde, GO, Brasil

*Corresponding author: mariana.egea@ifgoiano.edu.br

Another factor that can influence early weaning is the amount of additional liquid in the baby bottle. Infants who receive beverages other than breastmilk or infant formula in baby bottles may develop “nipple confusion” as the food is easily ingested, requiring less effort, while the infant needs more effort to consume breast milk (Batista et al., 2017; Dominguez et al., 2017; Luz et al., 2021). In addition, the use of a baby bottle and other artificial teats (such as pacifiers) can cause changes in facial muscles, resting posture of the lips, and the formation of the dental arch, among others (Rosa et al., 2020; Doğramacı & Rossi-Fedele, 2016; Zen et al., 2020).

As each infant has individualized energy, micronutrient, and macronutrient needs, the process of weaning and transition to complementary feeding must be individualized and must take into consideration their family community and culture (Lawrence & Lawrence, 2021). Even during complementary feeding (liquid or solid), breastmilk should be offered as recommended by the WHO to maintain breastfeeding until two years of age or older (World Health Organization, 2017). Currently, great advances have been made in promoting breastfeeding, but the beneficial effects of timely complementary feeding and using age- and condition-appropriate foods for the infant have been neglected (Corrêa et al., 2009).

In addition, early food introduction can expose infants to foods that are high in calories, sugars, trans- and saturated fat, and sodium as well as low in fiber, vitamins, and minerals. This type of diet can affect the immune process, impairing the physical and mental development of the child, in the early development of noncommunicable chronic diseases (Lessa et al., 2020). Thus, we investigated the prevalence of early complementary feeding in the first six months of life in a medium-sized city in the Midwest region of Brazil (Rio Verde, GO, Brazil).

2 Materials and methods

2.1 Ethical guidelines

This study was approved by the ethics committee of the Universidade de Rio Verde (UniRV) (063/2011). Data collection was performed after informed verbal consent by parents or guardians due to the time available for application of the questionnaire in vaccination campaigns. This is because reading and signing the consent form can consume practically the same amount of time as that spent on answering the questionnaire.

2.2 Study design

This was a cross-sectional, descriptive, observational study focused on children under one year of age (infants). The researchers approached the participants of the first stage of the 2012 National Vaccination Campaign in Rio Verde City (Goiás, Brazil) at 19 vaccination posts. The child's companion was approached in the line for vaccination, where the child's age was questioned. A total of 989 children under one year of age were screened. Of these, 564 children under six months of age who resided in the municipality and were authorized by their parents or guardians for participation in the study, were selected for the study.

The data collection was performed using non-invasive methods and occurred in a specific room where the participants were interviewed individually to avoid embarrassment. Participants benefited from receiving pamphlets on 10 steps for healthy eating for children under 2 years old and 10 steps for successful breastfeeding at the end of the interview. Participants' socio-demographic and food consumption data were collected through the application of the adapted Questionnaire of Investigation of Feeding Practices of Children under one year of the National Survey of Breastfeeding (Brasil, 2009). Briefly, the mother or guardian was asked how the infant had been fed in the last 24 h, and the options consisted of only breastmilk or alternatives such as water, tea, other milk; sweet or salt porridge; fruit in piece or mashed; meal with salt (pan, porridge, or soup); natural fruit juice or coconut water; industrialized fruit juice or coconut water; soft drinks; coffee; food sweetened with sugar; honey, molasses, and sweeteners; cookie, crackers, or chips; and instant noodles. The instructions in the Interviewer's Manual for the application of the questionnaire were respected, thus maintaining methodological rigor so that errors do not occur in the analysis and in obtaining the results.

2.3 Statistical analysis

Student's t-test was used to compute the variation between two groups. Statistical significance was set at $p < 0.05$. The percentage of each variable was also calculated. Correlation analysis was performed using Pearson's test.

3 Results and discussion

Of the 989 children who were screened for participation, only 564 infants under six months of age (65.8% under four months and 34.2% between four to six months of age) were enrolled and examined in this study. The overall characteristics of the infants enrolled are as follows: 277 (49.1%) male and 287 (50.9%) female infants (Figure 1A), and 556 (98.6%) infants lived in urban areas and 8 (1.4%) infants in the rural areas (Figure 1B). Furthermore, when considering the highest level of education attained by the participant's mother or their guardian, 2 (0.4%) mothers had not been educated, 157 (27.8%) mothers had attained elementary education, 274 (48.6%) mothers had completed high school, and 115 (20.4%) mothers had obtained university education (Figure 1C).

Table 1 shows the distribution of food consumption for 564 infants under six months of age sorted by the area of residence in Rio Verde (GO). In the families surveyed, 81.2% of infants under six months of age were breastfed in the last 24 hours (81.1% were urban and 87.5% from rural areas), of which 21.5% were exclusively breastfed, 15.9% received complementary milk form, and 43.8% were given another type of milk (43.9% were from urban and 37.5% from rural areas, respectively). When questioned if the infants had received any other foods since birth, 49.3% of parents or guardians responded in the affirmative (49.5% from urban and 37.5% from rural areas).

According to the WHO, infants should be exclusively breastfed until six months of age because of its nutritional and immunological value (World Health Organization, 2017). Studies

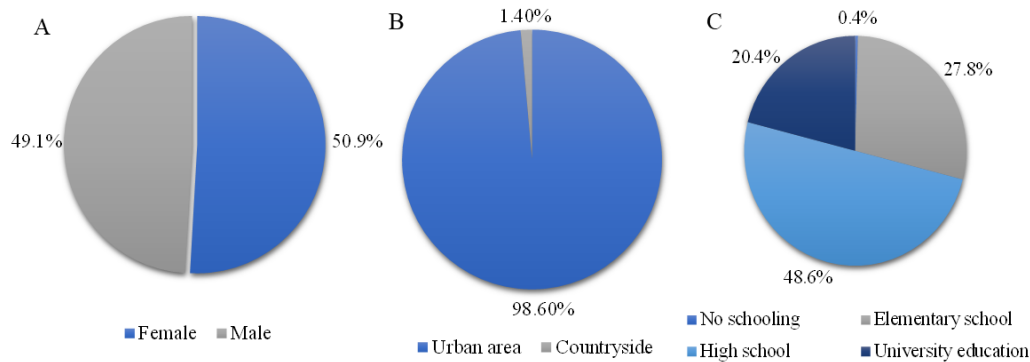


Figure 1. A demographics of the participants: (A) gender, (B) place of residence, and (C) highest education level of the infant's mother or their guardian.

Table 1. Distribution of food consumption, according to the area where they lived, in 564 infants under 6 months of age in Rio Verde (GO).

Variable	N	Urban area (%)	Rural area (%)	Significance
Water	236	41.7	50	0.000
Tea	121	21.6	12.5	0.000
Other milk	247	43.9	37.5	0.718
Sweet or salted porridge	63	11.3	0	0.706
Sliced or mashed fruit	77	13.7	12.5	0.612
Meal with salt (pan, porridge, or soup)	63	11.2	0	0.599
Natural fruit juice or coconut water	68	12.1	12.5	0.366
Industrialized fruit juice or coconut water	12	2.2	0	0.368
Soft drinks	4	0.7	0	0.361
Coffee	16	2.9	0	0.374
Food sweetened with sugar, honey, molasses, or sweetener		11,5	0	0.443
Cookies, crackers, or chips	39	6.8	12.5	0.325
Instant noodles	7	1.2	0	0.155
Any foods other than milk from birth		49.5%	37.5%	0.710

have shown that with a longer duration of breastfeeding, there is a lower risk of mortality from infections, malnutrition, and allergies, as well as chronic noncommunicable diseases in adulthood (Cohen et al., 2018; Koletzko et al., 2019; Pattison et al., 2019).

Regarding the consumption of other liquids, families reported that 41.8% of infants were given water (41.7% were urban and 50% from rural areas), 21.5% tea (21.6% were urban and 12.5% from rural areas), 12.1% natural fruit juice or coconut water (12.1% were urban and 12.5% from rural areas), 2.1% industrialized juice or coconut water (only from urban areas), 0.7% soft drinks (only from urban areas), and 2.8% coffee (only from urban areas).

Offering liquids such as water and tea to infants under six months of age is a common cultural practice in many countries. However, even when it happens occasionally, it can cause a reduction in the consumption of breast milk. This in turn results in a decrease in the production of milk by the mother, due to the reduction in the frequency of the infant's sucking stimulus. As a result, the additional liquid sources may contribute to early weaning, an increased risk of diarrhea, and reduced rate of weight gain in the infant (Campos et al., 2015; Niquini et al., 2010).

Mosquera et al. (2019) evaluated exclusive breastfeeding in the first month of life among Amazonian infants, reported that only 36.7% of the infants were exclusively breastfed, and 43.7% of the infants were offered foods other than breastmilk. The foods offered included tea (38.8%), water (31.4%), non-human milk and infant formula (30.7%), and crushed cassava (10.3%), in addition to fruit juice, rice porridge, yogurt, and condensed milk.

When assessing the consumption of solid food, 11.2% of infants received porridge (only from urban areas), 13.7% of infants received sliced or mashed fruit (13.7% were urban and 12.5% from rural areas), 11.2% of infants were given meals with salt (pan, porridge, or soup) (only from urban areas), 6.9% of infants were fed cookies, crackers, or chips (6.8% were urban and 12.5% from rural areas), and 1.2% of infants ate instant noodles (only from urban areas). In addition, 11.3% of the infants surveyed consumed foods sweetened with sugar, honey, molasses, and sweeteners.

When comparing the differences in the feeding patterns over time, there was a decrease in breast milk feeding (87.1% of infants under four months of age versus 69.9% of infants aged between four and six months). Simultaneously, the consumption of the following increased for infants under four months of age

versus infants aged between four and six months, including water (27% versus 70.5% respectively), other milks (37.5% versus 56% respectively), sweet or salted porridge (6.5% versus 20.2% respectively), sliced or mashed fruit (3.8% versus 32.6% respectively), meal with salt (3% versus 26.9% respectively), natural fruit juice or coconut water (3.5% versus 28.5% respectively), industrialized fruit juice or coconut water (1.1% and 4.1% respectively), soft drinks (0.3% versus 1.6% respectively), coffee (1.3% versus 5.7% respectively), food sweetened with sugar, honey, molasses, and sweeteners (7.8% versus 18.1% respectively), and cookies, crackers, or chips (1.3% and 17.6% respectively).

The introduction of other foods at four months of age may be associated with the mother's return to work, since the Federal Constitution in Brazil only mandates 120 days of maternity leave (Brasil, 2002). Regardless of the need to return to work, it is necessary to consider that many of the foods that were reported in this study contain added salt, sugar, or are industrialized, and their inclusion so early in the diet should be avoided (World Health Organization, 2013). The early introduction of these foods as seen in the present work is deeply concerning because the first thousand days of life are extremely important for human beings to establish the metabolic and nutritional factors that have short- and long-term impacts on the health of individuals (Agosti et al., 2017). Food should be introduced in a gradual and regular routine with natural or minimally processed foods, such as fruits, vegetables, eggs, beans, and meat (Giesta et al., 2019).

Infants close to six months of age, especially in a society undergoing nutritional transition, receive a high supply of processed foods rich in calories, sugar, fat, and sodium. These factors generate inadequate food throughout childhood such as a preference for eating junk food (Neves et al., 2021). The introduction of industrialized foods during the growth and development period predisposes the child to issues including weight gain, the emergence of chronic diseases in adulthood, and even food allergies (Giesta et al., 2019).

Toloni et al. (2011) reported similar results in a study where they examined the diets of 270 children aged between 4 and 29 months who attended nurseries and day care centers and observed the introduction of instant noodles in 25.9% of children, snack type chips in 14.9% of children, and stuffed cookies in 17.4% of children before they were six months old. Meanwhile, when Wang et al. (2019) questioned guardians about their six-month-old infant's feeding habits (n = 2157), the authors reported that the most common foods introduced before four months of age were porridge (11.8%), fruits (11.0%), vegetables (6.4%), and sweet drinks (6.1%).

These foods have a potential risk of inducing obesity because they are high in sugar, fat, and sodium. The introduction of these foods should be discouraged in the first years of life because of the numerous problems they can trigger. For example, in Brazil, data from 2019 shows that 6.4 million children under the age of 10 are overweight and 3.1 million are obese (Victor, 2021). At the same time, evidence shows that the quality of nutrition associated with an unhealthy lifestyle has negative effects on an individual's health (Rzehak et al., 2017) and that metabolic risk factors are increasingly prevalent among children and adolescents (Kansra et al., 2021).

Table 2. Pearson's correlation between education level and food intake in the last 24 hours in children up to six months of age in Rio Verde (GO).

Variables	Pearson's Correlation	P
Breastmilk	-0.010	0.816
Water	0.098	0.020
Tea	-0.013	0.761
Other milks	-0.064	0.127
Sweet or salted porridge	-0.037	0.385
Sliced or mashed Fruit	-0.015	0.724
Meal with salt (pan, porridge, or soup)	-0.044	0.301
Natural fruit juice or coconut water	-0.059	0.160
Industrialized fruit juice or coconut water	-0.054	0.200
Soft drinks	-0.055	0.193
Coffee	-0.058	0.166
Food sweetened with sugar, honey, molasses, or sweetener	-0.061	0.149
Cookie, crackers, or chips	-0.054	0.201
Instant noodle	-0.062	0.139
Any foods other than milk from birth	0.091	0.031

Table 2 shows Pearson's Correlation between the mother's highest level of education and food intake in the last 24 hours in infants up to six months of age in Rio Verde (GO). Considering our sample (urban and rural areas), it was possible to find a slightly significant positive correlation between the early introduction of water or foods other than breastmilk and the highest education levels of the parents or guardians. This behavior has also been reported by Wang et al. (2019), wherein characteristics such as lower maternal education levels and younger maternal age were associated with the early introduction of complementary feeding; by Mosquera et al. (2019) where a higher proportion of babies exclusively breastfed was observed for mothers with more than nine years of schooling; and by Alvarenga et al. (2017) who reported that higher the level of education of the parents the greater the association of exclusive breastfeeding.

The major limitations of the study arose due to the limited amount of time available for completing the questionnaire at the site where the participants were approached. The limitations included difficulty in evaluation of the type of feeding offered (only breastfeeding, feeding with infant formula, or other foods), in addition to a lack of details about the food introduced pertaining to the method of preparation, frequency, and quantity given to the infant. Such studies are required to monitor inappropriate feeding practices in the first six months of life and direct public policies regarding better nutritional diets for infants.

4 Conclusion

The children evaluated had an early introduction to food, mainly between the fourth and sixth months of life. Therefore, it is important that health professionals encourage exclusive breastfeeding until the sixth month of life and teach the correct way and age to introduce complementary foods.

Acknowledgements

The authors acknowledge the financial support of CNPq, FAPEG, CAPES (001), and IF Goiano (Process no 23218.002089.2022-12 and 23218.003243.2022-73).

References

- Agosti, M., Tandoi, F., Morlacchi, L., & Bossi, A. (2017). Nutritional and metabolic programming during the first thousand days of life. *La Pediatria Medica e Chirurgica*, 39(2), 157. <http://dx.doi.org/10.4081/pmc.2017.157>. PMID:28673078.
- Alvarenga, S. C., Castro, D. S., Leite, F. M. C., Brandão, M. A. G., Zandonade, E., & Primo, C. C. (2017). Fatores que influenciam o desmame precoce. *Aquichan*, 17(1), 93-103. <http://dx.doi.org/10.5294/aqui.2017.17.1.9>.
- Batista, C., Ribeiro, V., & Nascimento, M. (2017). Influence of the use of artificial nipples and baby bottles in breastfeeding. *Journal of Health & Biological Sciences*, 5(2), 184-191. <http://dx.doi.org/10.12662/2317-3076/jhbs.v5i2.1153.p184-191.2017>.
- Bickell, M., Barton, C., Dow, K., & Fucile, S. (2018). A systematic review of clinical and psychometric properties of infant oral motor feeding assessments. *Developmental Neurorehabilitation*, 21(6), 351-361. PMID:28272918.
- Brasil, Ministério da Saúde. (2009). *II pesquisa de prevalência de aleitamento materno nas capitais brasileiras e Distrito Federal*. Brasília: Editora do Ministério da Saúde.
- Brasil. (2002, April 16). *Lei no 10.421, de 15 de abril de 2002. Diário Oficial da República Federativa do Brasil*, seção 1.
- Campos, A. M. S., Chaoul, C. O., Carmona, E. V., Higa, R., & Vale, I. N. (2015). Exclusive breastfeeding practices reported by mothers and the introduction of additional liquids. *Revista Latino-Americana de Enfermagem*, 23(2), 283-290. <http://dx.doi.org/10.1590/0104-1169.0141.2553>. PMID:26039299.
- Cohen, S. S., Alexander, D. D., Krebs, N. F., Young, B. E., Cabana, M. D., Erdmann, P., Hays, N. P., Bezold, C. P., Levin-Sparenberg, E., Turini, M., & Saavedra, J. M. (2018). Factors associated with breastfeeding initiation and continuation: a meta-analysis. *The Journal of Pediatrics*, 203, 190-196.e21. <http://dx.doi.org/10.1016/j.jpeds.2018.08.008>. PMID:30293638.
- Corrêa, E. N., Corso, A. C. T., Moreira, E. A. M., & Kazapi, I. A. M. (2009). Alimentação complementar e características maternas de crianças menores de dois anos de idade em Florianópolis (SC) *Revista Paulista de Pediatria*, 27(3), 258-264. <http://dx.doi.org/10.1590/S0103-05822009000300005>.
- Doğramacı, E. J., & Rossi-Fedeles, G. (2016). Establishing the association between nonnutritive sucking behavior and malocclusions: a systematic review and meta-analysis. *The Journal of the American Dental Association*, 147(12), 926-934.e6. <http://dx.doi.org/10.1016/j.adaj.2016.08.018>. PMID:27692622.
- Dominguez, C. C., Kerber, N. P. C., Rockembach, J. V., Susin, L. R. O., Pinheiro, T. M., & Rodrigues, E. F. (2017). Dificuldades no estabelecimento da amamentação: visão das enfermeiras atuantes nas unidades básicas de saúde. *Revista Enfermagem UERJ*, 25, e14448. <http://dx.doi.org/10.12957/reuerj.2017.14448>.
- Giesta, J. M., Zoche, E., Corrêa, R. S., & Bosa, V. L. (2019). Fatores associados à introdução precoce de alimentos ultraprocessados na alimentação de crianças menores de dois anos. *Ciência & Saúde Coletiva*, 24(7), 2387-2397. <http://dx.doi.org/10.1590/1413-81232018247.24162017>. PMID:31340258.
- Harrison, M., Brodribb, W., & Hepworth, J. (2017). A qualitative systematic review of maternal infant feeding practices in transitioning from milk feeds to family foods. *Maternal and Child Nutrition*, 13(2), e12360. <http://dx.doi.org/10.1111/mcn.12360>. PMID:27696658.
- Kansra, A. R., Lakkunarajah, S., & Jay, M. S. (2021). Childhood and adolescent obesity: a review. *Frontiers in Pediatrics*, 8, 581461. <http://dx.doi.org/10.3389/fped.2020.581461>. PMID:33511092.
- Koletzko, B., Godfrey, K. M., Poston, L., Szajewska, H., Van Goudoever, J. B., Waard, M., Brands, B., Grivell, R. M., Deussen, A. R., Dodd, J. M., Patro-Golab, B., & Zalewski, B. M. (2019). Nutrition during pregnancy, lactation and early childhood and its implications for maternal and long-term child health: the early nutrition project recommendations. *Annals of Nutrition & Metabolism*, 74(2), 93-106. <http://dx.doi.org/10.1159/000496471>. PMID:30673669.
- Lawrence, R., & Lawrence, R. (2021). *Breastfeeding: a guide for the medical professional* (9th ed.). Philadelphia: Elsevier.
- Lessa, A., Garcia, A. L., Emmett, P., Crozier, S., Robinson, S., Godfrey, K. M., & Wright, C. M. (2020). Does early introduction of solid feeding lead to early cessation of breastfeeding? *Maternal and Child Nutrition*, 16(4), e12944. <http://dx.doi.org/10.1111/mcn.12944>. PMID:31995283.
- Luz, R. T., Cardoso, R. A., Climaco, L. C. C., Teixeira, M. A., Cruz, N. M., Ribeiro, V. M., & Ferraz, I. S. (2021). Determinantes do desmame precoce: revisão integrativa. *Práticas e Cuidado: Revista de Saúde Coletiva*, 2, e11258.
- Mazo-Tomé, P. L., & Suárez-Rodríguez, M. (2018). Prevalence of exclusive breastfeeding in the healthy newborn. *Boletín Médico del Hospital Infantil de México*, 75(1), 49-56. PMID:29652878.
- Mosquera, P. S., Lourenço, B. H., Gimeno, S. G. A., Malta, M. B., Castro, M. C., & Cardoso, M. A. (2019). Factors affecting exclusive breastfeeding in the first month of life among Amazonian children. *PLoS One*, 14(7), e0219801. <http://dx.doi.org/10.1371/journal.pone.0219801>. PMID:31295320.
- Neves, R. O., Guimarães, L. S. P., Bosa, V. L., Nunes, L. M., Silva, C. H., Goldani, M. Z., & Bernardi, J. R. (2021). Infant processed food consumption and their interaction to breastfeeding and growth in children up to six months old. *BMC Public Health*, 21(1), 1512. <http://dx.doi.org/10.1186/s12889-021-11539-5>. PMID:34353303.
- Niquini, R. P., Bittencourt, S. A., Lacerda, E. M. A., Oliveira, M. I. C., & Leal, M. C. (2010). Acolhimento e características maternas associados à oferta de líquidos a lactentes. *Revista de Saúde Pública*, 44(4), 677-685. <http://dx.doi.org/10.1590/S0034-89102010005000022>. PMID:20585740.
- Pattison, K. L., Kraschnewski, J. L., Lehman, E., Savage, J. S., Downs, D. S., Leonard, K. S., Adams, E. L., Paul, I. M., & Kjerulf, K. H. (2019). Breastfeeding initiation and duration and child health outcomes in the first baby study. *Preventive Medicine*, 118, 1-6. <http://dx.doi.org/10.1016/j.ypmed.2018.09.020>. PMID:30287329.
- Rosa, D. P., Bonow, M. L. M., Goettems, M. L., Demarco, F. F., Santos, I. S., Matijasevich, A., Barros, A. J., & Peres, K. G. (2020). The influence of breastfeeding and pacifier use on the association between preterm birth and primary-dentition malocclusion: a population-based birth cohort study. *American Journal of Orthodontics and Dentofacial Orthopedics*, 157(6), 754-763. <http://dx.doi.org/10.1016/j.ajodo.2019.06.014>. PMID:32487305.
- Rzehak, P., Oddy, W. H., Mearin, M. L., Grote, V., Mori, T. A., Szajewska, H., Shamir, R., Koletzko, S., Weber, M., Beilin, L. J., Huang, R. C., & Koletzko, B. (2017). Infant feeding and growth trajectory patterns in childhood and body composition in young adulthood. *The American Journal of Clinical Nutrition*, 106(2), 568-580. <http://dx.doi.org/10.3945/ajcn.116.140962>. PMID:28659295.
- Sattari, M., Serwint, J. R., & Levine, D. M. (2019). Maternal implications of breastfeeding: a review for the internist. *The American Journal*

- of Medicine*, 132(8), 912-920. <http://dx.doi.org/10.1016/j.amjmed.2019.02.021>. PMID:30853481.
- Specht, I. O., Rohde, J. F., Olsen, N. J., & Heitmann, B. L. (2018). Duration of exclusive breastfeeding may be related to eating behaviour and dietary intake in obesity prone normal weight young children. *PLoS One*, 13(7), e0200388. <http://dx.doi.org/10.1371/journal.pone.0200388>. PMID:29995949.
- Tampah-Naah, A. M., Kumi-Kyereme, A., & Amo-Adjei, J. (2019). Maternal challenges of exclusive breastfeeding and complementary feeding in Ghana. *PLoS One*, 14(5), e0215285. <http://dx.doi.org/10.1371/journal.pone.0215285>. PMID:31048865.
- Toloni, M. H. A., Longo-Silva, G., Goulart, R. M. M., & Taddei, J. A. A. C. (2011). Introdução de alimentos industrializados e de alimentos de uso tradicional na dieta de crianças de creches públicas no município de São Paulo. *Revista de Nutrição*, 24(1), 61-70. <http://dx.doi.org/10.1590/S1415-52732011000100006>.
- Victor, N. (2021). *Obesidade infantil afeta 3,1 milhões de crianças menores de 10 anos no Brasil*. Retrieved from <https://pesquisa.bvsalud.org/portal/resource/pt/lis-48232>
- Wang, L., Van Grieken, A., Van Der Velde, L. A., Vlasblom, E., Beltman, M., L'Hoir, M. P., Boere-Boonekamp, M. M., & Raat, H. (2019). Factors associated with early introduction of complementary feeding and consumption of non-recommended foods among Dutch infants: the BeeBOFT study. *BMC Public Health*, 19(1), 388. <http://dx.doi.org/10.1186/s12889-019-6722-4>. PMID:30961551.
- World Health Organization – WHO. (2013). *Essential nutrition actions: improving maternal, newborn, infant and young child health and nutrition*. Geneva: WHO.
- World Health Organization – WHO. (2017). *Guideline: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services*. Geneva: WHO.
- World Health Organization – WHO. (2020). *Improving early childhood development: WHO guideline*. Geneva: WHO.
- Yu, C., Binns, C. W., & Lee, A. H. (2019). The early introduction of complementary (solid) foods: a prospective cohort study of infants in Chengdu, China. *Nutrients*, 11(4), 760. <http://dx.doi.org/10.3390/nu11040760>. PMID:30939733.
- Zen, I., Soares, M., Pinto, L., Ferelle, A., Pessan, J., & Dezan-Garbelini, C. (2020). Maxillary arch dimensions in the first 6 months of life and their relationship with pacifier use. *European Archives of Paediatric Dentistry*, 21(3), 313-319. <http://dx.doi.org/10.1007/s40368-019-00487-9>. PMID:31630369.