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COMPLEMENTARY FEEDING APPROACHES: CHARACTERISTICS, DIFFERENCES AND IMPACT ON CHILD DEVELOPMENT

ABORDAGENS DE ALIMENTAÇÃO COMPLEMENTAR: CARACTERÍSTICAS, DIFERENÇAS E IMPACTO NO DESENVOLVIMENTO INFANTIL

Ana Paula Ferreira de Almeida[1], Ana Thais Campos de Oliveira[1], Fernanda Tayla de Sousa Silva[1], Sheyla Maria Barreto Amaral[1], Felipe Sousa da Silva[1], Ysabele Yngrydh Valente Silva[1], Everlândia Silva Moura Miranda[1], Joene Vitória Rocha Santos[1], Kelvi Wilson Evaristo Miranda[2]

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ABSTRACT
The term complementary feeding refers to including the first solid foods in the child's diet after six months of age. The food introduction involves the Traditional, Responsive, Baby Led Weaning (BLW), Baby Led Introduction to Solids (BLISS) and Participatory approaches. This work aimed to identify the main characteristics and differences of complementary feeding approaches in the scientific literature, and to present an infographic of food assembly and its different textures. This study is a narrative literature review, developed from searching for articles in the PubMed, CAPES journals and Google Academic electronic databases. Scientific materials were selected after reading the titles and abstracts, specifying the researchers' references and briefly checking the texts. After analysis, it was possible to distinguish the main characteristics about each complementary feeding approach and identify the low scientific volume for BLW and BLISS regarding the benefits and distinctions between the approaches.

KEYWORDS: Child nutrition. Food introduction. Food textures

RESUMO
O termo alimentação complementar refere-se à introdução dos primeiros alimentos sólidos na dieta da criança após os seis meses de idade. A introdução dos alimentos envolve as abordagens Tradicional, Responsiva, Desmame Conduzido por Bebê (BLW), Introdução aos Sólidos Conduzida por Bebê (BLISS) e Participativa. Este trabalho teve como objetivo identificar as principais características e diferenças das abordagens de alimentação complementar na literatura científica, e apresentar um infográfico de montagem de alimentos e suas diferentes texturas. Este estudo é uma revisão narrativa da literatura, desenvolvida a partir da busca de artigos no PubMed, periódicos CAPES e bases de dados eletrônicas Google Acadêmico. Os materiais científicos foram selecionados após a leitura dos títulos e resumos, especificando as referências dos pesquisadores e checando brevemente os textos. Após a análise, foi possível distinguir as principais características de cada abordagem de alimentação complementar e identificar o baixo volume científico para BLW e BLISS quanto aos benefícios e distinções entre as abordagens.

PALAVRAS-CHAVE: Nutrição infantil. Introdução alimentar. Texturas dos alimentos

INTRODUCTION

The World Health Organization (WHO) advises that breastfeeding should be exclusively performed until the sixth month of life in view of its nutritional composition for the immature

[1] Instituto Federal de Educação, Ciência e Tecnologia do Ceará, *campus* Limoeiro do Norte.
[2] Centro Estadual de Educação Profissional Rural Frei José Apicella, Piauí.

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digestive system, and the presence of growth and biological agents which activate the endocrine system (immunoglobulins) in which antibodies provide security against infection. It additionally has a low cost, effective action in reducing child morbidity and mortality and efficiency in promoting the health of mother and baby [1].

Early childhood is marked by the rapid evolution and maturation of the digestive and neuropsychomotor systems, encompassing capacities such as receiving, chewing and digesting nutrients other than breast milk. The nutritional properties of foods to be eaten by the child, associated with their well-being, are crucial points during the maturation process to adulthood. Childhood is characterized by being one of the most susceptible phases for nutritional deficiencies and dysfunctions, especially in the post-breastfeeding period [2].

Inappropriate infant feeding poor in nutritional components can increase the probability of disease occurrence. The guidance presented is that a safe complementary food should be inserted after the period of six months of life (post-breastfeeding), with adequate consistency along with quality nutritional properties and in appropriate quantity. Thus, it contributes to an increase in healthy well-being with regard to weight gain, prevention of illnesses such as allergies, diarrhea, reduced risk of developing hypertension, diabetes, obesity and increased cholesterol throughout life ([1], [2], [3]).

Complementary feeding refers to including the first solid foods in the child's diet from six months of age, indicating the completion of exclusive breastfeeding in order to complement breast milk, and meeting the child's nutritional needs [4]. This diet must provide energy sources and essential nutrients through ingestion of a multiplicity of food combinations such as cereals, vegetables, meats, fruits and vegetables ([3], [4]). In addition, it is necessary to observe the hygienic and sanitary aspects of these foods, meaning the foods must present an absence of chemical, physical and biological contaminants (pathogenic bacteria and fungi). Complementary food is directly influenced by family culture, having to adapt to family socioeconomic and cultural standards seeking to not offer ultra-processed foods in view of the high values of nutritional losses and incorporation of synthetic substances such as flavourings, sweeteners, preservatives, among others ([3],[4]).

It should be noted that food introduction encompasses a variety of approaches, including Traditional, Responsive, Baby Led Weaning (BLW), Baby Led Introduction to Solids (BLISS) and Participatory to understand the differences and specific characteristics of each in order to help both health professionals and families during the infant's food introduction phase considering the importance of introducing solid foods in the diet for physical, cognitive and nutritional development.

Therefore, this study aimed to identify the main characteristics and differences of complementary feeding approaches in the scientific literature (2017-2021), as well as to create an infographic showing the foods and their different textures in order to facilitate understanding of each type of existing approach through a qualitative vision.

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METHODS

Qualitative research

This research is characterized as a qualitative study obtained through a Narrative Literature Review to identify the main characteristics and differences of complementary feeding approaches, also called food introduction. According to Godoy [5], qualitative research allows to appreciate reality, making it possible to give care to social research at the level of truth that cannot be measured. It works with opinions, principles, and other characteristics of relationships that are not reduced to the instrumentalization of elements. A Narrative Review is recognized for not having a rigid methodology; however, it has essential importance to reach the understanding of a certain defined theme, showing recent conditions of greater or lesser perceptibility in the established literature [6].

The bibliographic search of scientific articles was carried out through the Pubmed, CAPES Periodicals and Academic Google electronic databases, considering publications between the years 2017-2021, and using the following operators and descriptors in the English language: “infant feeding” OR “food introduction” AND “baby-led weaning” OR “Baby Lead Introduction to Solids” OR “traditional food introduction” OR “responsive feed introduction” OR “participatory food introduction”, whichever would be present in the title and/or keywords.

The study considered publications in English, Portuguese and Spanish, in the “Open Access” form (free online access) in the format of complete journal articles from qualitative research. Next, the following exclusion criteria were applied: (i) articles which did not address the proposed issue; (ii) duplicate publications; (iii) reviews; (iv) monographs; (v) dissertations; and (vi) theses.

After selecting the articles, Content Analysis was performed in two stages. In the first stage, the articles had their themes analysed in a generic way by reading the titles and abstracts, applying specifications of the researchers’ references and briefly checking the texts. Finally, understanding of the findings was performed in a second step as described by [7].

Guides were used to compose the information of the aforementioned research: “Dietary Guide for Brazilian Children under 2 years old” Ministry of Health [8]; “Practical Update Guide – Complementary feeding and the BLW method of the Brazilian Society of Pediatrics (SBP)” [9] and “Participatory Feeding Introduction Guide” [10]. The results are presented in two topics: (i) approaches which use a spoon for complementary feeding: Traditional, Responsive and Participatory; and (ii) approaches that do not use a spoon for complementary feeding: BLW and BLISS.

Infographic

Photography is characterized as a non-verbal communication which considerably contributes to studies of a theoretical nature and helps as an explanatory and demonstrative tool in

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visually presenting the diversity of scientific findings [11]. Thus, the following foods were chosen according to the guidelines of the "Food Guide for Children under 2 years old" to be photographed considering the period after six months of breastfeeding: (i) a food from the cereals or roots group and tubers; (ii) a food from the beans group; (iii) one or more foods from the legume group; and (iv) a food from the meat and eggs group [8]. Furthermore, oranges and sweet potatoes were inserted for the BLISS approach. All foods were evaluated and classified as free from physical and mechanical damage and were subjected to an adequate sanitation and sanitation process. The construction of the infographic layout was aided by the Graphic Design platform Canva®.

RESULTS AND DISCUSSION

Approaches which use a spoon for complementary feeding: Traditional, Responsive and Participatory

Complementary feeding initiated by the Traditional approach is characterized by gradually introducing solid foods in the texture of purees or liquefied porridge offered with the aid of a spoon, and therefore, the person responsible for the child will control all of this process, in which the concern is directed to the amount of food that will be made available and consumed by it ([12], [13]).

The application of the approach is coercive and dominating, without the child's interaction and participation in exploring the foods and making their food choices and can provide future difficulties in terms of "having" control of their appetite and consequences in the ingestion of food in excess, promoting an increase in body weight and increasing the probability of developing childhood obesity ([12], [13]). It should be noted that the Ministry of Health does not recommend this approach, as the food offered to the child should not be liquefied or sieved [8].

The Responsive approach is recommended by the World Health Organization (WHO), and it attends and respects the baby's responses immediately with regard to the self-regulation mechanism. Therefore, this approach is correlated with beneficial effects for the baby. Such an approach knows and satisfies the child's signs of hunger and satiety, does not require the use of "strength" if they do not want to eat, and enables promoting appetite control, thereby allowing to reduce the danger of excessive caloric intake, preventing overweight and obese children [12].

It is essential that the environment is calm and pleasant at the time of feeding, that the child is properly placed in the chair and seated. In addition, the food offered must be adequate in terms of texture and nutritional aspects. It is also important to monitor the indicators of hunger and satiety in order to generate a quick response, considering the emotional aspects that may contribute to adequate and satisfactory development [14].

The Ministry of Health and the Brazilian Society of Pediatrics (*SBP*) guide the Responsive approach that foods need to be initially textured from a pasty point to puree, mashed, shredded, crushed and in larger sizes according to the child's growth. In addition, they indicate that the dish

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should contain one food from each food group, as well as meals should be offered at family mealtimes, ensuring a pleasant environment, valuing the child's time and contributing to their social and motor development ([8], [9]).

Pallewaththa *et al.* [14], assessed Responsive feeding habits through interviews with 18 guardians of children aged 6 to 12 months. The authors observed that understanding the proper implementation of this approach is low, which may lead to difficulties for the proper growth and progress of the baby's health.

The recommendations of Participatory complementary feeding are similar to the Responsive ones. In this approach the child is actively responsible for the steps of introducing solids in their feeding, even if the food is offered by a family member (intermediary role). Thus, the process starts to be assisted by family members who are responsible for assisting in the child's choice of options, accompanying them until they obtain their skills and effectively ingest a healthy diet. Participatory feeding applies similar principles of the BLW approach (Baby Led Weaning) through the motivation of offering food in pieces and not just purees, mashed, or shredded foods, and using the aid of a spoon so that the baby has the opportunity to know different textures and experiences with different foods through the contact of their hands [10].

Spoon-free approaches for complementary feeding: BLW and BLISS

Baby Led Weaning (BLW) or "baby-guided weaning" (free translation) was proposed as a newsletter by British author Gill Rapley as an approach that is increasingly being embraced by families during children's food introduction phase ([13], [15],[16]). This approach is characterized by introducing solid food in the form of pieces in the child's diet from the sixth month of life so that the child can lead it to their mouth alone, at their own will, without using a spoon or food in textures of purees; this is so the child decides when to start eating, what to eat, how to eat, and the volume to consume ([13], [15],[16]).

According to the scientific literature, there are different benefits of BLW in the introduction of food, such as: (i) better control of the baby to respond to their appetite and satiety, enabling a greater probability of adequate weight gain; (ii) participation in family meals from the beginning of complementary feeding; (iii) possibility of getting to know different types of food based on their sensory aspects; and (iv) better motor development, autonomy and confidence during the feeding process ([13], [15],[16]).

However, despite the benefits of BLW, the *SBP* raises some questions about possible future consequences for the child, such as: (i) intake of sufficient nutrients and energy and its repercussions for their progress; (ii) whether the baby is more likely to gag or choke; and (iii) be suitable for the family's customs [9].

Utami [17], evaluated the experiences of 13 Indonesian mothers in the BLW approach in introducing their children's food through the application of interviews. The authors observed that

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there was greater autonomy for children during their feeding, especially in exploring new food varieties (such as vegetables), enabling greater control in the regulation of their appetite. In addition, the children showed an emotional increase in terms of joy at feeding time. However, there were occurrences of choking, but there was knowledge of prophylactic actions by the parent.

Poniedziałek [18], followed the experiences of 373 mothers in Poland about the BLW approach through applying an online questionnaire. The authors identified that the mothers showed apprehension with risk of choking at the start of introducing food, especially with apple fruit. However, they reported several benefits of the approach, such as improved motor development, chewing, speech, sensory experiences, healthier eating and indicated adherence to the BLW approach, but highlighted the disorganization ("food on the floor", "waste of food").

Mezynska [19], conducted a survey with 933 guardians of children and investigated the information and guidance of 96 health workers in relation to the BLW approach through a questionnaire. The results showed that the vast majority of parents partially apply BLW and that health professionals still do not have sufficient and detailed information on the BLW approach to assist in guiding family members who choose the technique.

Regarding nutritional status, Jones *et al.* [20], evaluated the impact of the type of complementary feeding approach on the development of children aged 3 to 12 months of life using anthropometric assessment (weight and height) and evaluated according to BMI (body mass index). The results showed that there was no significant difference in weight and BMI between children who were introduced to feeding with a spoon and those who used BLW. However, children who were fed with a spoon and infant formula weighed more.

Morrison [21], carried out a survey with 51 children aged 6 to 8 months of age, in which they compared the intake of nutrients and foods according to the food introduction approach (with BLW and traditional with spoon) using a questionnaire and food record every three days. The authors found that there was no significant difference in the consumption of energy foods between the approaches. However, children across the BLW were more likely to ingest total fats and ingest less minerals (iron, zinc) and vitamin B12, but all two groups received foods with a risk of choking.

A study by Almeida [22], shows how to avoid the risk of choking in the BLW approach. To do so, the authors used photographic records of different foods belonging to the groups of fruits, vegetables, legumes, cereals and meats to determine the safe way to offer food in the BLW approach according to the baby's grip, in this case their palm by pincer and upper index finger, in order to avoid choking and assist in the motor development of babies who adhere to BLW.

A study by Vieira [16], compared the attributes of introducing food for children aged 1 to 2 years old submitted to traditional and BLW approaches by applying an online interview. The results showed that children who used BLW were breastfed for a longer period than children who followed traditional feeding. In addition, they had less contact with infant formula, ultra-processed foods, baby bottles, pacifiers and had meals with their families, as they sit correctly at the table and use

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the proper texture of the food.

The Baby Led Introduction to Solids (BLISS) approach, translated into Portuguese as "Baby Guided Introduction to Solids", is similar to the BLW approach with modifications due to the apprehension of the occurrence of possible choking and nutritional problems (deficiency of iron and energy) for children who only adhere to BLW ([9], [15]). BLISS suggests that solid foods offered to children should be in cuts with shapes of larger pieces in order to avoid potential choking, but avoid rounded foods, and always supervised by the responsible person. In addition, the main feature of this approach is the supply of iron-rich foods (foods that aid in absorption, rich in vitamin C) and with a high energy source [9].

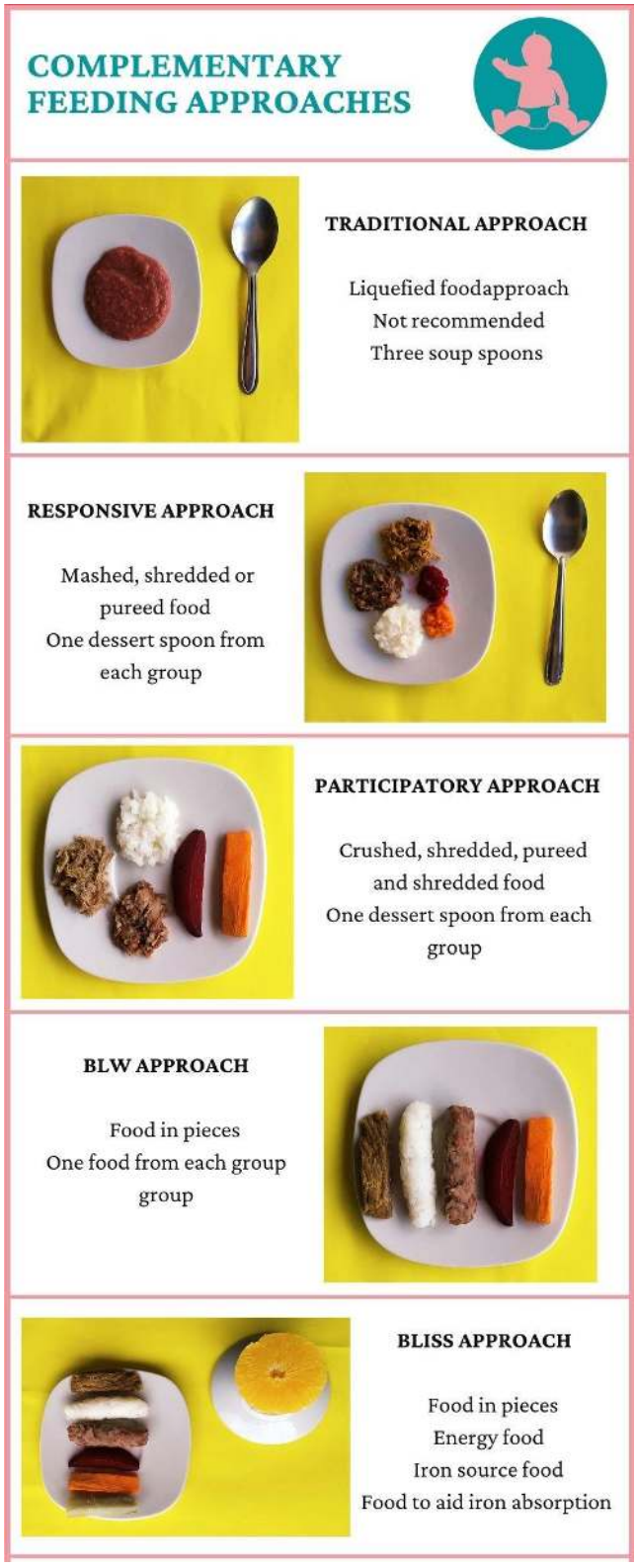
A randomized clinical trial by Taylor [15], with European mothers with children aged 12 to 24 months were divided into two groups: the control (spoon feeding) and BLISS, in order to assess whether babies in the BLISS approach had a lower BMI than the control group. The authors observed that children who follow the BLISS had better enthusiasm at the time of feeding, being less rigid in their food choices. However, there was no significant difference regarding BMI between groups.

Erickson [23], analyzed the effects of the BLISS approach on nutrient intake in children aged 7 to 24 months using children's feeding records over three days when compared to the intake of infants following the spoon approach. The authors found that babies in the BLISS approach ingested more sodium and fat at 7 months. However, there was no significant difference in this intake in both groups at 24 months, along with an increase in sugar consumption. The study concluded that the BLISS group had a nutritionally adequate diet in the same way as the spoon-fed group.

Figure 1 shows the informative infographic considering the feeding of a breastfed six-month-old child. The visual material structuring took into account the amount of three tablespoons or one dessert spoon of each food group, within the group proposed in the methodology (rice, beans, meat, beetroot, carrot), plus orange and sweet potato for the BLISS approach.

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Figure 1- Complementary Feeding Approaches



Fonte: Própria

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CONCLUSIONS

It was possible to distinguish the main characteristics about each complementary feeding approach (traditional, responsive, Baby Led Weaning – BLW, Baby Led Introduction to Solids – BLISS and participatory), as well as identify the differences in textures when offering food by them. It is important to emphasize that the approach recommended by the WHO, SBP and the Ministry of Health is Responsive feeding, with guidelines for children to touch food and that their signs of hunger and satiety are respected, thus guaranteeing their autonomy, and complemented by the concepts of Participatory approach. The Traditional approach is not recommended due to the insertion of liquefied foods.

There are few conclusive studies on the long-term impacts on child health for the BLW and BLISS approaches. Therefore, it is suggested that it is essential to carry out more research in order to evaluate all the reported approaches in order to know which one is really the most effective (or effective) for the adequate growth and development of the child, in turn contributing to improve knowledge about each one of them and allowing to cooperate with health professionals and family members in this important stage of child development for acquiring healthy eating habits.

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