THE INTIMATE RELATIONSHIP BETWEEN EXCLUSIVE BREASTFEEDING AND COGNITIVE DEVELOPMENT

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ABSTRACT

Objective: to explore the multiple aspects of this connection, addressing both the cognitive benefits of exclusive breastfeeding and the underlying mechanisms that underlie this relationship with cognitive development.

Methodology: this is an integrative review of the literature. The guiding question was adopted: "What is the impact of exclusive breastfeeding in the first months of life in promoting children's cognitive development?" To construct the research, data collection and analysis was carried out through the Medical Literature Analysis and Retrieval System Online, Scientific Electronic Library Online and the Virtual Health Library Portal through the following Health Sciences Descriptors (DeCS): "Breastfeeding", "Cognition", "Psychology" and "Nutritional Epidemiology" combined with each other by the Boolean operator AND with their respective counterparts in Mesh Terms.

Results and Discussion: after completing the methodological procedures, 14 articles available on the VHL Portal, in the PubMed and SciELO databases were selected, which show that there is a recommendation regarding exclusive breastfeeding in the first six months of life as the best means of nutrition for babies, considering that, in addition to providing essential nutrients, breast milk is rich in antibodies, enzymes and other components that promote health and protection against diseases, influencing the cognition process of individuals.

Final Considerations: it is imperative that health professionals, policy makers, communities and families recognize and value the intimate relationship between exclusive breastfeeding and children's cognitive development.

Keywords: Breast Feeding, Cognition, Psychology, Nutritional Epidemiology.

A ÍNTIMA RELAÇÃO ENTRE A AMAMENTAÇÃO EXCLUSIVA E O DESENVOLVIMENTO COGNITIVO

RESUMO

Objetivo: explorar os múltiplos aspectos dessa conexão, abordando tanto os benefícios cognitivos da amamentação exclusiva quanto os mecanismos subjacentes que fundamentam essa relação com o desenvolvimento cognitivo.


Resultados e Discussão: após o cumprimento dos procedimentos metodológicos, 14 artigos disponíveis no Portal da BVS, na base de dados PubMed e na SciELO foram selecionados, os quais retratam que há recomendação
The Intimate Relationship Between Exclusive Breastfeeding and Cognitive Development

The intimate relationship between exclusive breastfeeding and cognitive development is a subject of extensive study and research. It has been observed that breast milk provides not only essential nutrition but also plays a crucial role in cognitive development. This age-old practice has been the subject of study and research, revealing a close relationship between exclusive breastfeeding and the mental development of children. Social support during the first months of life is crucial for optimal cognitive development.

Introducción

El aleitamiento exclusivo en los primeros seis meses de vida es uno de los aspectos clave para el desarrollo cognitivo de los niños. No solo aporta nutrientes esenciales, sino que también contiene anticuerpos, enzimas y otros componentes que promueven la salud y la protección contra enfermedades, influenciando en el proceso de cognición del individuo.

Palabras clave: Aleitamento Materno, Cognição, Psicologia, Epidemiologia Nutricional.
breastfeeding can also strengthen family and community ties by providing a vital support network during maternity challenges (Costa; Gedro E Rosa, 2023).

According to the Brazilian Society of Pediatrics (2018), in a world where science continues to unravel the mysteries of child development, exclusive breastfeeding emerges as one of the most influential factors in baby brain formation. From the first days of life, breast milk offers a unique combination of nutrients, antibodies and bioactive factors that not only sustain physical growth but also stimulate neural development.

Research has consistently shown that infants fed exclusively on breast milk in the first six months of life have significant cognitive advantages compared to those fed with formulas or a combination of breast milk and formula. These benefits extend beyond childhood and have been associated with improvements in cognitive skills such as memory, information processing, and lifelong language skills (McGowan and Bland, 2023).

According to Haque, Mihrshahi and Haider (2023), the explanation for this relationship between exclusive breastfeeding and cognitive development is complex and multifaceted. In part, it is attributed to the unique composition of breast milk, which contains essential fatty acids, proteins, hormones and growth factors that directly support brain development. In addition, the act of breastfeeding promotes mother-baby interaction, stimulating not only the feeding, but also the affective bond and sensory stimulation, crucial factors for the cognitive and emotional development of the child.

The influence of exclusive breastfeeding on cognitive development is not only limited to biological aspects, but is also rooted in socioeconomic and cultural factors. The availability of breast-feeding support, access to accurate information on the benefits of breast-feeding, and policies promoting maternity leave and supportive working environments play important roles in promoting breast-feeding and, consequently, child cognitive development (Jordan et al., 2022).

In line with Bai, Lee 2 and Overgaard (2019) it is essential to recognize that exclusive breastfeeding may not be a viable option for all mothers and infants, due to a variety of reasons, such as maternal health problems, lactation difficulties, or socioeconomic circumstances. In such cases, supportive strategies and nutritional alternatives should be made available to ensure the best possible development for the baby.

The relationship between exclusive breastfeeding and cognitive development is deep and multifaceted, influenced by a complex interaction of biological, social and cultural factors. Recognizing and supporting the importance of exclusive breastfeeding not only benefits the healthy growth and development of children, but also contributes to the construction of a more
informed and empathetic society in relation to the needs of mothers and babies (Amoo; Popoola; Lucas, 2022).

Ulfa and her collaborators (2023) state that the relationship between exclusive breastfeeding and cognitive development transcends the boundaries of nutrition, extending into the context of the child's emotional and social development. Studies suggest that exclusively breastfed infants are more likely to develop secure bonds with their mothers, which in turn contributes to a solid foundation in the development of social and emotional abilities. Skin-to-skin contact during breastfeeding also releases love hormones, such as oxytocin, that promote feelings of safety and well-being, essential for healthy emotional development.

In addition to the direct benefits to the infant, exclusive breastfeeding is also associated with long-term benefits to maternal mental health. Exclusively breastfeeding mothers tend to have lower levels of postpartum depression and higher self-esteem, which can create a more positive and stable environment for child development (Oyetunji and Prakash, 2020). In light of this, we will explore the multiple aspects of this connection, addressing both the cognitive benefits of exclusive breastfeeding and the underlying mechanisms that underpin this relationship with cognitive development.

2 METHODOLOGY

An integrative review of the literature was performed through the PICo strategy (which designates respectively P: population/patients; I: intervention; C: comparison/control; O: outcome/outcome) in order to address the specificities of the present study (Santos and Galvão, 2014). This perspective is shown in Table 1.

Thus, the guiding question consisted of: "What is the impact of the practice of exclusive breastfeeding in the first months of life on the promotion of child cognitive development?"

Table 1

Preparation of the study question according to the PICo strategy. Viseu, Portugal, 2024.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Returns TRUE on success or FALSE on failure.</th>
<th>Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Population</td>
<td>Infants and infants</td>
</tr>
<tr>
<td>I.</td>
<td>Interest</td>
<td>Impact of exclusive breastfeeding</td>
</tr>
<tr>
<td>Co</td>
<td>Background</td>
<td>Practice of exclusive breastfeeding and child cognitive development.</td>
</tr>
</tbody>
</table>

Source: Santos and Galvão (2014).
In April 2024, national and international articles were searched online in the Medical Literature Analysis and Retrieval System Online, Scientific Electronic Library Online and the Virtual Health Library Portal. In addition, literature keywords relevant to the subject were collected, as described in Table 2.

**Table 2**

Descriptors controlled and according to the guiding issue. Viseu, Portugal, 2024.

<table>
<thead>
<tr>
<th>DeCS</th>
<th>Mesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast-Feeding</td>
<td>Breast Feeding</td>
</tr>
<tr>
<td>Cognition</td>
<td>Cognition</td>
</tr>
<tr>
<td>Psychology</td>
<td>Psychology</td>
</tr>
<tr>
<td>Nutritional Epidemiology</td>
<td>Nutritional Epidemiology</td>
</tr>
</tbody>
</table>

Source: Mesh Terms and DeCS, 2024.

The inclusion criteria for literary studies were defined as the time delimitation of the last five years, due to the possibility of finding a greater number of scientific articles on the theme. In addition, only articles made available in Portuguese, English and Spanish were included. As exclusion criteria, any literature published by non-official means, articles that exceed the established time limit, that do not include the objective of the study and that address the theme in other scenarios, having no direct relation to the proposed theme.

3 RESULTS

After the completion of the methodological procedures, 14 articles available in the PubMed, BVS and SciELO database were selected. The year of publication ranged from 2019 to 2024. After applying the search syntax described in Table 1, 130 articles were found. After the review of the abstracts and deletion of the articles according to the criteria described above we obtain for complete review 13 articles. Table 3 provides detailed information on the studies chosen for the analysis.

**Table 3**

Strategy used to perform searches of the databases. Viseu, Portugal, 2024.

<table>
<thead>
<tr>
<th>Base</th>
<th>Search Expressions</th>
<th>Ee</th>
<th>Es</th>
<th>He</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBMED</td>
<td>((Breast Feeding) AND (Cognition) AND (Psychology) AND (Nutritional Epidemiology))</td>
<td>14</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>VHL</td>
<td>(Breast-Feeding) AND (Cognition) AND</td>
<td>66</td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>
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(Psychology) AND (Nutritional Epidemiology)
(SCIELO)
(Breast Feeding) AND (Cognition) AND (Psychology) AND (Nutritional epidemiology)

Source: drafting of the authors.
Subtitle: VHL - Virtual Library on Health; Ee - Studies found; Es - Selected studies; Ei - Studies included in the review after critical reading.

Source: Prepared by the author.

The selection of articles can be verified through the flowchart, with the recommendations of PRISMA 2020 (Page et al., 2021).

Figure 1

Source: Research author, 2024.
Table 4
Publications included in the second author/year study, title, objective and main results. Viseu, Portugal, 2024.

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Title</th>
<th>Purpose</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotheram-Borus et al., 2019.</td>
<td>Maternal HIV does not affect resiliency among uninfected/HIV exposed South African children from birth to 5 years of age</td>
<td>Examine resilience among a South African population cohort of mothers living with HIV and mothers without HIV in low-income municipalities in the first 5 years of life.</td>
<td>Typical protective factors (e.g. home visit, breastfeeding, preschool) were not related to resilience in the first 5 years of life.</td>
</tr>
<tr>
<td>Kim; Jae-Won, 2020.</td>
<td>Associations between breastfeeding and cognitive function in children from early childhood to school age: a prospective birth cohort study</td>
<td>Examine the associations between breastfeeding and cognitive development in Korean children 1 to 8 years of age using multimodal and multi-informant assessment and a prospective study design.</td>
<td>Cognitive development was found to be improved in infants who were breastfed for &gt; 3 months. Although these findings are supported by previous studies, it is important to note that other factors have been reported as larger determinants of cognitive development than breastfeeding.</td>
</tr>
<tr>
<td>Black; McLaughlin; Giles, 2020.</td>
<td>Women's experience of social media breastfeeding support and its impact on extended breastfeeding success:</td>
<td>It investigates the experiences of women who use a social media group on Facebook to support breastfeeding and tries to explore whether it has helped in the prolonged success of breastfeeding.</td>
<td>The symbiotic relationship between members of a social media group facilitates greater breastfeeding success and longer breastfeeding duration through the central concept of reciprocal determinism of Cognitive Social Theory.</td>
</tr>
<tr>
<td>Sousa et al., 2020.</td>
<td>Prevalence and factors associated with breastfeeding in the first hour of life in term live births in southwestern Bahia, 2017*</td>
<td>To analyze the prevalence and factors associated with breastfeeding in the first hour of life (AMPHV) in term live births in Vitória da Conquista, BA, Brazil.</td>
<td>AMPHV was associated with maternal factors, prenatal care and hospital care.</td>
</tr>
<tr>
<td>Synnes et al., 2021.</td>
<td>Family integrated care: very preterm neurodevelopmental outcomes at 18 months</td>
<td>Examine whether the family integrated care program (FICare), a multifaceted approach that allows parents to be engaged as primary caregivers in the neonatal intensive care unit, impacts neurodevelopment and child growth at 18 months of corrected age.</td>
<td>Very premature infants exposed to CICare did not show significant difference in the incidence of cognitive retardation or language, but showed better motor development.</td>
</tr>
<tr>
<td>Charpak et al., 2022.</td>
<td>Kangaroo mother care had a protective effect on the volume of brain structures in young adults</td>
<td>Determining whether providing the Kangaroo Mother Method in childhood affected brain volumes in young adults.</td>
<td>Our findings suggest that the neuroprotective effects of the Kangaroo Mother Method for premature infants</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Study</th>
<th>Research Question</th>
<th>Findings/Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dellen; Wisse; Mobach, 2022.</td>
<td>Effects of lactation room quality on working mothers’ feelings and thoughts related to breastfeeding and work: a randomized controlled trial</td>
<td>Find out whether offering a high-quality lactation room can help facilitate the combination of breastfeeding and work. Current studies show that not only the availability but also the quality of lactation rooms is important to facilitate the combination of breastfeeding and work.</td>
</tr>
<tr>
<td>Cooijmans; Beijers; Weerth, 2022.</td>
<td>Daily skin-to-skin contact and crying and sleeping in healthy full-term infants:</td>
<td>Examine the effects of a 5-week daily skin-to-skin contact (CSC) intervention, compared to usual care, on term infant crying and sleep duration during the first 12 weeks postnatal. Mother-infant SCC, when done regularly, can be a cost-effective intervention to reduce the crying of the baby and potentially also extend the duration of infant sleep.</td>
</tr>
<tr>
<td>Pilus et al., 2022.</td>
<td>Communication of a Theory-Based Health Education Intervention on Breastfeeding Self-Efficacy (SeBF Intervention): Cluster Randomized Controlled Field Trial</td>
<td>Develop, implement and evaluate the effect of the use of an in-person health education intervention and via WhatsApp based on cognitive social theory, the module Self-efficacy in Breastfeeding (SeBF), on the self-efficacy, knowledge and attitudes of mothers in a district of Selangor state. Participation in the SeBF program, developed on the basis of sociocognitive theory, in person and via WhatsApp, has contributed to improving self-efficacy and knowledge about breastfeeding. New studies need to be conducted for longer duration (up to 6 months postpartum) to evaluate their effectiveness in increasing exclusive breastfeeding.</td>
</tr>
<tr>
<td>Banerjee et al., 2022.</td>
<td>Does breastfeeding account for the association between maternal sensitivity and infant cognitive development in a large, nationally representative cohort?</td>
<td>It investigates whether the association between maternal sensitivity and childhood cognitive development in the first year of life is explained by other factors, such as breastfeeding, maternal depressive symptoms, use of maternal alcohol, infant birth weight, or demographic covariates. Understanding the factors that affect the association between sensitivity and child cognitive development provides pathways to the development of more effective parental interventions.</td>
</tr>
<tr>
<td>Lovcevic, 2023.</td>
<td>Associations of breastfeeding duration and cognitive development from childhood to middle adolescence</td>
<td>Evaluate the dose-response association between breastfeeding duration and cognitive abilities in children 5 to 15 years of age. These results support a dose-response relationship between breastfeeding duration and non-verbal language and intelligence abilities during childhood and early adolescence.</td>
</tr>
<tr>
<td>Elgzar et al., 2023.</td>
<td>The Relationship between Maternal Ideation and Exclusive Breastfeeding</td>
<td>Examining the predictive role of maternal ideation in SMA practices can persisted beyond infancy and improved its functionality and quality of life throughout life. Maternal ideation constructs are positive predictors of satisfactory SMA practice.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Study Title</th>
<th>Summary</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice among Saudi Nursing Mothers: A Cross-Sectional Study</td>
<td>Help direct and strengthen cooperation among multidisciplinary health professionals to formulate multidisciplinary strategies for breastfeeding improvement and can be used to predict high-risk groups and plan new interventions.</td>
<td>Çankaya and Atas, 2023.</td>
</tr>
<tr>
<td>The relationship of psychological well-being and cognitive emotions with breastfeeding self-efficacy in mothers in the postpartum period</td>
<td>Determine the relationship between psychological well-being and cognitive emotional regulation and self-efficacy of breastfeeding in postpartum mothers.</td>
<td>The self-efficacy in breastfeeding of mothers in good psychological condition, who may utilize adaptive cognitive coping strategies and who exclusively breastfeed their infants is positively affected. Emotional arousal and cognitive assessment may be two sources of stigma about feedback to children, although people recognize that breastfeeding is an important health problem.</td>
</tr>
<tr>
<td>From Brelfies Help to Normalize Breastfeeding in Public: Lewd or Food?</td>
<td>Investigate whether breastfeeding selfies contribute to normalizing the practice of breastfeeding in public, exploring the public's perceptions and reactions towards these images, and discern whether they are seen predominantly as a natural and nourishing expression of motherhood or as something lewd.</td>
<td>From Brelfies Help to Normalize Breastfeeding in Public: Lewd or Food?</td>
</tr>
</tbody>
</table>

Source: own preparation, 2024.
4 DISCUSSION

Exclusive breastfeeding in the first few months of life is an essential component of child health and well-being, and is widely recognized for its nutritional and immunological benefits. However, its influence on childhood cognitive development has also received increasing attention. This discussion seeks to explore the intimate relationship between exclusive breastfeeding and cognitive development, analyzing studies and evidence that investigate the impacts of this crucial practice in the early stages of a child's life (Rotheram-Borus et al., 2019; Çankaya and Atas, 2023).

The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) recommend exclusive breastfeeding in the first six months of life as the best means of nutrition for babies. According to Kim and Jae-Won (2020), in addition to providing essential nutrients, breast milk is rich in antibodies, enzymes and other components that promote health and protection against disease. This study investigating the association between breastfeeding and cognitive function in children aged 5 and a half to 8 years found that cognitive development improved in children who were breastfed for more than 3 months, indicating the correlation between factors (Bresnahan; Zhuang, 2023).

Cognitive development refers to the construction of mental abilities, including language, thinking, reasoning, and social skills. This process begins in the early stages of life and is influenced by a variety of factors, including genetics, family environment, and nutrition. In view of this, women who promote breastfeeding for a longer period can see the increase in the self-efficacy of the cognition and development of their children. The explanation of this evidence to breastfeeding women positively impacted on the experiences of women, assisting them in the success of breastfeeding (Black; McLaughlin and Giles, 2020; Rotheram-Borus et al., 2019).

Also, according to Sousa and her collaborators (2020) breast milk is widely recognized for its health benefits and child development, including significant impacts on cognition. Several components of breast milk contribute to the baby's cognitive development. Long-chain polyunsaturated fatty acids, especially docosahexaenoic acid (DHA) and arachidonic acid (ARA), are crucial for the development of the brain and retina. DHA is particularly important for the formation of cell membranes in the brain, contributing to neurogenesis, synaptogenesis and synaptic plasticity.

Studies show that breast-fed infants, who are naturally rich in DHA, tend to have better outcomes in tests of cognition, memory, and motor skills. Lactoferrin, in turn, is a glycoprotein
with antimicrobial, anti-inflammatory and immunomodulatory properties. In addition to its immune functions, lactoferrin is also important for brain development. It helps in the maturation of glial cells, promotes neuronal growth and protects against brain damage caused by infections and inflammations (Synnes et al., 2021; Charpak et al., 2022).

In addition, Dellen, Wisse, and Mobach (2022) exemplify that HMOs are complex carbohydrates unique to human milk. They are not digested directly by the infant, but play an essential role in the formation of the intestinal microbiota. A healthy gut microbiota is essential for general health and cognitive development, as there is a bidirectional interaction between the gut and brain (gut-brain axis). HMOs also have neuroprotective properties and can influence brain development directly.

In addition, breast milk contains several growth factors, such as epidermal growth factor (EGF) and insulin-like growth factor (IGF). These factors are important for the growth and development of neural tissues. The EGF, for example, promotes the survival and differentiation of neurons, while the IGF is involved in neurogenesis and synaptogenesis. However, colostrum, produced in the first days after delivery, is particularly rich in proteins, vitamins and minerals, and contains high concentrations of immunological and growth factors (Cooijmans; Beijers; Weerth, 2022).

Pilus and his collaborators (2022) state that this "first milk" is crucial for the initial development of the immune system and for the formation of the foundations of cognitive development. Breast milk provides a wide range of vitamins and minerals essential for brain development, including Vitamin B12, which is needed for the synthesis of neurotransmitters and for the maintenance of myelin, vitamin D, which is important for cognitive function and for mood regulation and Zinc, which is essential for neuropsychological function and for brain cell growth.

Choline is a vital nutrient present in breast milk, essential for the synthesis of acetylcholine, an important neurotransmitter for memory and learning. Choline also contributes to cell membrane structure and cell signaling. In addition, breast milk contains various hormones, such as oxytocin and leptin, which can influence behavior and cognitive development. Oxytocin, for example, is associated with the mother-child bond and with social and emotional development. Breast milk is rich in antioxidants, such as vitamin E, that protect the developing brain from oxidative stress, which can cause neuronal damage (Banerjee et al., 2022).

Recently, it was discovered that breast milk contains microRNAs, small fragments of RNA that can influence gene expression and consequently neuronal development and synaptic...
plasticity. The combination of these components creates a unique nutritional and biochemical environment that supports optimal cognitive development in the early years of life. The synergistic interaction between these components promotes healthy brain growth, strengthens the immune system, and contributes to the formation of robust neuronal connections, laying a solid foundation for learning and ongoing cognitive development (Lovcevic, 2023).

According to Synnes and his collaborators (2021) breast milk contains a wide range of essential nutrients, including polyunsaturated fatty acids such as docosaexaenoic acid (DHA), which are important for brain and vision development. In addition, breast milk provides proteins, carbohydrates, vitamins and minerals that are fundamental for the healthy growth and development of the baby. It is worth noting that very premature newborns exposed to family-integrated care did not present significant differences in the incidence of cognitive or language retardation, however, they were observed to have better motor development (Kim; Jae-Won, 2020).

In addition to the specific nutrients, exclusive breastfeeding also offers other protective and stimulating factors for cognitive development, such as physical and emotional contact between mother and baby, which are crucial for the child's emotional and social development. Currently, research proves that another important factor necessary for the growth and development of the newborn is the Mother Kangaroo method, which promotes neuroprotective effects for premature infants, improving their functionality and quality of life over time (Charpak et al., 2022; Black; McLaughlin; Giles, 2020).

Dellen, Wisse, and Mobach (2022) have consistently demonstrated a positive association between exclusive breastfeeding and improved cognitive outcomes in children through their scientific studies. Longitudinal research has followed infants from birth to childhood, showing that those who were exclusively breastfed tend to have higher scores on cognitive development tests. However, the challenging combination of breastfeeding and work is found to be one of the main factors triggering the early abandonment of this practice (Synnes et al., 2021).

The mechanisms by which exclusive breastfeeding influences cognitive development are not yet fully understood. However, the specific nutrients present in breast milk are believed to play a crucial role in the formation and function of the developing brain. Furthermore, associated with the Kangaroo method on a regular basis, positive results are obtained that transcend cognitive development and act in the reduction of crying and discomfort of the infant, as well as potentializing and prolonging the duration of childhood sleep (Cooijmans; Beijers; Weerth, 2022; Charpak et al., 2022).
In line with Pilus and his collaborators (2022) although most studies suggest a positive association between exclusive breastfeeding and cognitive development, it is important to note that there are variations in outcomes. These variations can be attributed to methodological differences between studies, as well as to individual factors such as genetics, family environment, and socioeconomic. In certain countries such as Malaysia, exclusive breastfeeding rates are still not satisfactory. In view of this, sociocognitive theory and social networks are used to stimulate the practice of breastfeeding, practice health education and promote the cognitive benefits associated with this intervention (Dellen; Wisse; Mobach, 2022).

The benefits of exclusive breastfeeding for cognitive development can extend into childhood and beyond. Children who have been exclusively breastfed tend to exhibit better academic performance, problem-solving skills, and social behavior. It is worth pointing out that maternal sensitivity and breastfeeding are different means that contribute to the advancement of cognitive development in childhood. However, it is essential to analyze the fixed and modifiable factors that interfere with this association such as maternal depressive symptoms, alcohol use, infant birth weight and sociodemographic covariates (Banerjee et al., 2022; Cooijmans; Beijers; Weerth, 2022).

Lovcevic (2023) points out that the relationship between exclusive breastfeeding and cognitive development has important public health implications. Encouraging and supporting the practice of exclusive breastfeeding in the first months of life can help promote healthy cognitive development of children and reduce disparities in child health. Findings from the literature suggest several long-term benefits of prolonged duration of breastfeeding for cognitive development throughout childhood and adolescence. So that cognitive and language skills crucial to good academic performance perpetuate their effects in adult life (Pilus et al., 2022).

Exclusive breastfeeding in the first few months of life is closely linked to childhood cognitive development. Nutrients, protective factors, and stimuli present in breast milk play a crucial role in the formation and function of the developing brain, resulting in short- and long-term cognitive benefits for children. This understanding reinforces the importance of promoting and supporting the practice of exclusive breastfeeding as an essential component of child health and well-being, as well as with the aim of reducing mortality risk factors in this age group (Elgzar et al., 2023; Banerjee et al., 2022).
5 FINAL CONSIDERATIONS

The relationship between exclusive breastfeeding and childhood cognitive development is deeply complex and significant. Over the past decades, research has consistently demonstrated the cognitive benefits of exclusive breastfeeding in the first few months of life. The nutrients, protective factors and stimuli present in breast milk play a crucial role in the formation and function of the developing brain, contributing to better cognitive performance in children.

This relationship not only emphasizes the importance of exclusive breastfeeding as a fundamental practice for child health and development, but also highlights the need for public health policies and programs that actively support and promote this practice. Investing in education and support for mothers, in addition to creating supportive environments for breastfeeding in communities and workplaces, can play a crucial role in ensuring that more children have access to the cognitive and health benefits associated with exclusive breastfeeding.

Therefore, it is imperative that health care professionals, policymakers, communities and families recognize and value the close relationship between exclusive breastfeeding and child cognitive development. By doing this, we can work together to create an environment that promotes the well-being and maximum potential of all children from the early stages of their lives.

REFERENCES


The Intimate Relationship Between Exclusive Breastfeeding and Cognitive Development


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