Review Article

Toddler Development in the Context of Malnutrition: A Systematic Literature Review

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Abstract: Toddlerhood is a critical period for optimizing child development, as it is a time when foundational skills in various domains are formed. Malnutrition in children, including conditions like stunting, wasting, underweight, and kwashiorkor, poses a significant threat to this development. The effects of malnutrition are not isolated to a single domain but can disrupt and hinder growth across five developmental areas: gross motor skills, fine motor skills, language, personal-social skills, and cognitive skills. This study aims to examine the developmental characteristics of toddlers suffering from malnutrition, focusing on how these conditions impact their growth. A literature review design was employed, and articles were sourced from databases such as ScienceDirect, PubMed, and SpringerLink. The article search followed the PRISMA Flow Diagram, and a total of 5045 articles were initially identified. After screening, 10 articles were selected that met the inclusion criteria and research objectives. The findings from these studies consistently revealed that malnourished toddlers exhibit delays in the five developmental domains mentioned above. These delays, particularly in motor and cognitive skills, can have long-term consequences on a child's future development. This study emphasizes the importance of addressing malnutrition in the early years, as early intervention is crucial for mitigating developmental delays and improving overall well-being in affected children.

Keywords: Child Development; Malnutrition; Stunting; Toddlers; Underweight

1. Introduction

National development is essentially the development of the whole person. Efforts to develop the whole person must begin as early as possible, namely from the time a child is still in the womb and during infancy. Early childhood health development, from conception to age five, aims to protect children from the threat of death and disease that can cause disability, and to nurture, equip, and expand their potential to become resilient individuals in accordance with their inherent potential (Migang, 2021). The growth and development of infants and toddlers occurs through specific patterns. While developmental variation is quite wide, it is limited to the rate of development, not the pattern or sequence of development. Optimal growth and development of toddlers can occur if accompanied by adequate nutrition. Adequate nutrition will impact a child's nutritional status, where nutritional adequacy is reflected in the child's nutritional status (Maalouf-Manasseh et al., 2016).

Good nutrition puts children on the path to survival and optimal development. Well-nourished children grow, develop, learn, play, participate, and contribute, while malnutrition robs children of their full potential, with consequences for children, nations, and the world

(UNICEF et al., 2023). Malnutrition is defined as a nutritional state in which a deficiency, or excess, of energy, protein, and micronutrients leads to measurable adverse effects on tissue/body shape (body shape, size, and composition) and function, as well as clinical outcomes(Saghir Ahmad, 2015). Malnutrition, in all its forms, includes undernutrition (wasting, stunting, and underweight)(Chai et al., 2022).

The global prevalence of malnutrition in 2020 reached 149 million children under 5 years of age estimated to be stunted (too short for their age), 45 million estimated to be wasted (too thin for their height), and 38.9 million estimated to be overweight or obese. In Asia, the prevalence of stunting, overweight, and wasting is 21.8%, 5.2%, and 8.9%, respectively. Meanwhile, in ASEAN, the prevalence of stunting, overweight, and wasting is 27.4%, 7.5%, and 8.2%, respectively(World Health Organization (WHO), 2021).

Severe acute malnutrition is a macronutrient deficiency that can be seen in both children and adults. It encompasses a spectrum of protein-energy malnutrition conditions, such as kwashiorkor at one end and marasmus (wasting) at the other; and marasmic-kwashiorkor, with overlapping symptoms in between(Bunker & Pandey, 2021). Malnutrition occurs when nutrient intake does not meet the body's needs for normal functioning. This leads to altered growth and development in children, resulting in neurological, cognitive, and behavioral complications(Larson-Nath & Goday, 2019). Healthy cognitive development of children is not only an important goal but also influences later life outcomes, such as educational attainment, employment, and income (Attanasio, 2015).

2. Literature Review

Research on the relationship between malnutrition and early childhood development has been widely conducted in various countries, with a focus on various developmental domains, methods, and influencing factors.

2.1. Synthesis of Prior Research on the Relationship between Malnutrition and Child Development

Windyarti et al. (2021) examined the relationship between nutritional status and the development of toddlers aged 12–36 months in Indonesia. The results showed a significant association between nutritional status and developmental delays in four main domains: gross motor skills, fine motor skills, language, and personal-social skills. This study used a cross-sectional design with a sample of 55 toddlers.

Khandelwal et al. (2020) in India studied children with severe acute malnutrition (SAM) using the Bayley Scales of Infant and Toddler Development III. They found that 75% of children experienced motor and language delays, and 63% experienced cognitive delays. This study highlighted low birth weight and severe anemia as additional risk factors.

Ernawati et al. (2020) in Indonesia examined the relationship between linear growth and psychosocial caregiving on the cognitive development of 3-year-old children. The results

showed that children with persistent stunting from birth to age 3 tended to have delayed cognitive development. De & Chattopadhyay (2019) in India found that children with malnutrition (wasting, underweight, and stunting) experienced significant developmental delays in four domains. Age, gender, and birth weight were important determinants.

Saleem et al. (2020) in Pakistan reported that 61.1% of children with SAM experienced global developmental delays, particularly in the personal-social domain. This study used a cross-sectional design with 185 respondents.

Xie et al. (2018) in Bangladesh linked stunting to altered brain function and poor cognitive outcomes. Uneven growth was shown to impact brain connectivity and cognitive development. Workie et al. (2020) in Ethiopia identified a significant association between stunting and delays in all developmental domains, including communication and problem-solving.

Several other studies, such as Bunker & Pandey (2021), Ribe et al. (2018), and Rakotomanana et al. (2023), also highlighted the link between malnutrition and developmental delays, but added perspectives on environmental factors, parent-child interactions, and home stimulation.

2.2 Research Gap

Although previous research has identified a strong link between malnutrition and developmental delays in children, several gaps remain that need to be addressed: (1) most studies focus on one or two developmental domains, while delays can actually occur across five domains (gross motor, fine motor, language, personal-social, and cognitive); (2) many studies were conducted in specific countries or regions without comparison across global contexts; (3) variety in child development assessment methods makes it difficult to compare results across studies; and (4) factors contributing to developmental delays are often discussed separately; few studies integrate internal factors (low birth weight, chronic illness) and external factors (sanitation, caregiving, maternal employment) into a single, comprehensive analysis.

2.3 The Present Research Perspective

This systematic literature review synthesizes and critically appraises empirical evidence from a broad corpus of international studies spanning five key domains of child development adversely affected by malnutrition. Guided by the methodological rigor of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, the review employs a transparent and replicable selection process to identify, screen, and integrate relevant literature. Beyond aggregating prior findings, the study elucidates the underlying causal mechanisms and delineates evidence-based intervention strategies, thereby constructing a nuanced analytical framework. The resulting synthesis not only advances scholarly understanding of the multifaceted impacts of malnutrition but also provides a robust empirical foundation for the formulation and refinement of targeted, context-sensitive policies for its prevention and management.

3. Proposed Method

This study employed a systematic review approach guided by the PCC (Population, Concept, and Context) framework. The population (P) comprised toddlers aged ≤5 years. The concept (C) focused on developmental outcomes, while the context (C) addressed malnutrition, including stunting, wasting, overweight, and kwashiorkor. Relevant articles were identified through a systematic search of three major databases: ScienceDirect, PubMed, and SpringerLink. The search was limited to peer-reviewed international journal articles published between 2018 and 2023. The keywords applied were "malnutrition," "developmental," and "toddler."

The selection of articles for this review was conducted through a systematic screening process guided by predefined inclusion and exclusion criteria, following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The inclusion criteria comprised: (a) peer-reviewed articles published between 2018 and 2023, (b) original research studies, (c) full-text availability, and (d) study populations consisting of toddlers aged ≤5 years. The exclusion criteria were: (a) articles published in languages other than Bahasa Indonesia and English; and (b) duplicate records. The identification, screening, eligibility assessment, and final inclusion stages were documented using the PRISMA flow diagram to ensure methodological transparency. The methodological quality of eligible studies was appraised through a comprehensive review of both abstracts and full texts. Subsequently, the included studies were systematically synthesized and critically interpreted to generate evidence-based insights, which are presented in this review.

4. Results

A total of 5,045 records were identified through database searching. After screening based on the inclusion criteria—publications within the last five years, original research articles, available in full-text, and involving toddlers aged ≤5 years—507 records remained. Applying the exclusion criteria (other Indonesian and English language and duplicates) reduced the number to 18. Further full-text assessment excluded 8 records, resulting in 10 studies that met all inclusion criteria and were included in the final review. The selection process is summarized in the PRISMA 2020 Flow Diagram (Figure 1).
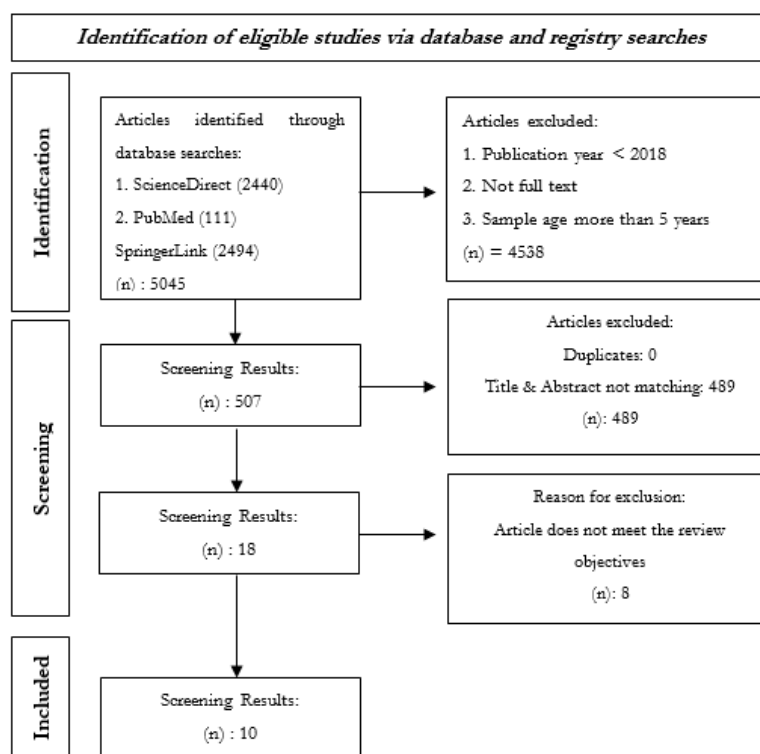
Figure 1. PRISMA Flow Diagram.

5. Discussions

5.1 Child Characteristics

Table 1 indicates that the majority of children experiencing malnutrition and developmental delays are under 36 months of age (Bunker & Pandey, 2021; De & Chattopadhyay, 2019; Ernawati et al., 2020; Khandelwal et al., 2020; Saleem et al., 2020). This age group is considered the most vulnerable, as toddlers are more susceptible to nutritional deficiencies and exhibit limited attention spans, which may affect feeding and stimulation practices. Moreover, the toddler period serves as a critical foundation for subsequent personality formation. Early childhood is widely recognized as the most crucial developmental stage in the human life course, during which rapid growth and neurodevelopment occur (Crookston et al., 2011; Lives et al., 2013).

5.2 Child Development

Table 2 there are five developmental domains: gross motor skills, fine motor skills, language skills, personal-social skills, and cognitive skills. Gross motor skills are skills used to move the arms, legs, and torso functionally. These skills involve the movement of the body's large muscles to perform actions such as walking, jumping, kicking, sitting upright, lifting, and throwing a ball (Manggau & Usman, 2020). Research (Khandelwal et al., 2020; Windyarti et al., 2021; Workie et al., 2020) reveals that malnourished toddlers tend to have lower gross motor development. This condition occurs because gross motor scores are more influenced by nutritional status, given the lack of physical strength due to malnutrition. Meanwhile, fine motor scores are relatively less dependent on this factor (Ribe et al., 2018).

Fine motor skills are limited movements involving small muscles, especially in the fingers. Examples include writing, cutting, drawing, and holding something with the thumb and index finger (Nua et al., 2023). Fine motor skills are more complex motor skills (Hayati & Tawati, 2021). Research (De & Chattopadhyay, 2019; Windyarti et al., 2021) found that malnourished children experience delayed development of fine motor skills. This may be due to inadequate nutrition to support growth and development. Furthermore, home stimulation plays a role in fine motor development (Rakotomanana et al., 2023).

Language development is a tool for communicating and interacting with someone, whether through speech, writing, or feelings, in a systematic and orderly manner, consisting of reading, listening, writing, and speaking, thus having a relationship with the ability to learn the mother tongue (Arini et al., 2019; Azhari, 2021). Several studies have found that children with malnutrition, especially malnutrition, will experience problems with language development (De & Chattopadhyay, 2019; Ernawati et al., 2020; Rakotomanana et al., 2023; Windyarti et al., 2021; Workie et al., 2020).

Personal-social skills emerge through the interaction of social influences, biological maturation, and children's representations of the social world and self. Malnutrition hinders brain development and the function of neurotransmitters that regulate emotions and social behavior. Lack of energy and concentration reduces children's participation in social interactions. As a result, personal-social skills are hampered and at risk of developing long-term developmental problems (Rakotomanana et al., 2023; Saleem et al., 2020).

Cognitive development is the ability to learn or think through all mental activity processes related to perception and information management, enabling a person to acquire knowledge, solve problems, and think about their environment (Nua et al., 2023). Malnutrition inhibits brain development by disrupting nerve cell formation, synaptic connections, and myelination, which are essential for thinking functions. Energy and micronutrient deficiencies also disrupt neurotransmitter production, thus affecting concentration and memory. As a result, children's cognitive abilities decline and risk hindering long-term learning (Bunker & Pandey, 2021; Ernawati et al., 2020; Khandelwal et al., 2020; Rakotomanana et al., 2023; Xie et al., 2018).

Children with malnutrition are at risk of developmental delays in five domains. These domains include impaired gross motor skills, impaired fine motor skills, language, personal-social skills, and cognitive skills (Bunker & Pandey, 2021; Ernawati et al., 2020; Khandelwal et al., 2020; Rakotomanana et al., 2023; Ribe et al., 2018; Saleem et al., 2020; Windyarti et al., 2021; Workie et al., 2020; Xie et al., 2018). Malnutrition in the first three years of life is associated with brain development. Brain growth and development require adequate nutrition. Nutritional adequacy during this period impacts a child's growth and development later in life. Children with malnutrition, especially those with undernutrition, are more susceptible to infections such as diarrhea, respiratory diseases, and malaria. These infectious diseases lead to increased malnutrition (Yulianti & Tepi R, 2020). This can lead to physical

weakness in children, creating a vicious cycle that results in stunted growth and development (De & Chattopadhyay, 2019; Ribe et al., 2018). Thus, prolonged malnutrition can reduce the number of neurons and their synapses, increase dendritic pruning, and reduce myelination, all of which contribute to developmental delays in motor, language, and cognitive domains (Arini et al., 2019; Cusick & Georgieff, 2016; Jimoh et al., 2018).

5.3 Other factors influencing developmental delays

Table 3 shows that developmental delays are also influenced by several internal and external factors. Internal factors include illnesses that affect a child's nutritional needs, low birth weight, exposure to tuberculosis, gender, and age. External factors include psychosocial care, environmental sanitation, breastfeeding practices, home stimulation and maternal occupation (De & Chattopadhyay, 2019; Ernawati et al., 2020; Khandelwal et al., 2020; Rakotomanana et al., 2023; Ribe et al., 2018; Saleem et al., 2020; Windyarti et al., 2021; Xie et al., 2018).

5.4 Intervention strategies

Prevention. Several preventive interventions can be undertaken by mothers who are pregnant or preparing for pregnancy. Prevention of malnutrition in children with developmental delays needs to begin early in life, from conception to the second year of life. This includes improving maternal nutrition during pregnancy, providing exclusive breastfeeding, and introducing semi-solid complementary foods starting at six months of age (De & Chattopadhyay, 2019). The first 1,000 days of life, including pregnancy and the first two years of life, are crucial for physical growth and broader cognitive, motor, and socioemotional development. The fetal, infancy, and early childhood periods represent a window of heightened developmental sensitivity, and modifiable insults occurring during these periods have potentially irreversible effects on growth and neurobehavioral development. Increasing access to play materials like picture books and educational toys can significantly enhance child stimulation and development. Early interventions during infancy are crucial to leverage rapid brain growth and neural plasticity, especially in regions with high malnutrition rates. Additionally, parents—particularly mothers—who understand the link between parent–child interaction and development are more likely to engage in stimulating practices that support their child's growth. (Rakotomanana et al., 2023).

Treatment. Ease of access to nutrition and developmental stimulation for all children with severe acute malnutrition involving mothers and therapists (Bunker & Pandey, 2021; Khandelwal et al., 2020). Language development stimulation is carried out by everyone, such as mothers, caregivers, family members, and groups (Ernawati et al., 2020). Better comprehensive health care in the first three years of life is a crucial window of opportunity when a large number of children are affected by disease, malnutrition, and other major health problems (Oumer et al., 2022).

Table 1. General Summary of Included Articles.

No	Author	Title	Year	Country	Sample	Design	Citation
1.	Mei Lia Nindya Zulis Windyarti, Poppy Fransisca Amelia & Esya Iriandica Al-Ashfiha	Relationship between toddler nutrition status and development of toddlers aged 12 – 36 months	2021	Indonesia	55 toddlers (12 – 36 months)	Cross-sectional study	(Windyarti et al., 2021)
2.	Navneet Khandelwal, Jagdish Mandliya, Kamma Nigam, Vandana Patil, Aditya Mathur, & Ashish Pathak	Determinants of motor, language, cognitive, and global developmental delay in children with complicated severe acute malnutrition at the time of discharge: An observational study from Central India	2020	India	104 toddlers (6 – 24 months)	Cross-sectional study	(Khandelwal et al., 2020)
3.	Fitrah ernawati, Pusparini, Hardinsyah, Dodik Briawan, Amalia Safitri, & Mutiara Prihatini	Effect of Low linear Growth and Caregiving with Poor Psychosocial Aspects on Cognitive Development of Toddler	2020	Indonesia	150 toddler (3 years old)	Longitudinal Study (Cohort Study)	(Ernawati et al., 2020)
4.	Partha De & Nandita Chattopadhyay	Effects of malnutrition on child development: evidence from a backward district of India	2019	India	450 toddlers (0 – 59 months)	Cross-sectional study	(De & Chattopadhyay, 2019)
5.	Javeria Saleem, Rubeena Zakar, Gul Mehar Javaid Bukhari,	Developmental delay and its predictors	2020	Pakistan	185 toddlers (6 - 59 months)	Cross-sectional study	(Saleem et al., 2020)

No	Author	Title	Year	Country	Sample	Design	Citation
	Aneela Fatima & Florian Fischer	among children under-five years of age with uncomplicated severe acute malnutrition: a cross sectional study in rural Pakistan					
6.	Wanze Xie, Sarah KG Jensen, Mark Wade, Swapna Kumar, Alissa Westerlund, Shahria H Kakon, Rashidul Haque, William A Petri & Charles A Nelson	Growth faltering is associated with altered brain functional connectivity and cognitive outcomes in urban Bangladeshi children exposed to early adversity	2018	Bangladesh	92 infant dan 118 toddler	Cohort Study	(Xie et al., 2018)
7.	Shimelash Bitew Workie, Tesfa Mekonen, Tefera Chane Mekonen & Wubalem Fekadu	Child development and nutritional status in 12 – 59 months of age in resource limited setting of Ethiopia	2020	Ethiopia	605 toddlers (12 – 49 months)	Cross-sectional study	(Workie et al., 2020)
8.	Sarah Bunker & Jyotsna Pandey	Educational Case: Understanding Kwashiorkor and Marasmus: Disease Mechanisms and Pathologic Consequences	2021	USA	1 toddler usia 3 years old	Case study	(Bunker & Pandey, 2021)
9.	Ingeborg G. Ribe, Erling Svensen, Britt A Lyngmo, Estomih Mduma, & Sven	Determinants of early child development in rural Tanzania	2018	Haydom, Tanzania	137 Toddler (15 Months)	Prospective Cohort Design	(Ribe et al., 2018)

No	Author	Title	Year	Country	Sample	Design	Citation
	G, Hinderaker						
10.	Hasina Rakotomanana, Deana Hildebrand, Gail E. Gates, David G. Thomas, Fanjaniaina Fwbush & Barbara J. Stoeker	Home Stimulation, development, and nutritional status of children under 2 years of age in the highlands of Madagascar	2023	Vakinankaratra, Madagascar	76 Toddler (11 – 13 Months)	Mix Methods	(Rakotomanana et al., 2023)

Table 2. Child Development with Malnutrition.

No	Author	Objectives	Results
1.	Mei Lia Nindya Zulis Windyarti, Poppy Fransisca Amelia & Esya Iriandica Al-Ashfiha	To determine the relationship between nutritional status and the development of toddlers aged 12 to 36 months.	There is a relationship between nutritional status and the development of toddlers aged 12-36 months which can be seen from the p-value = 0.003.
2.	Navneet Khandelwal, Jagdish Mandliya, Kamma Nigam, Vandana Patil, Aditya Mathur, & Ashish Pathak	To assess the motor, language, cognitive, and overall developmental outcomes with Severe Acute Malnutrition using the Bayley Scales of Infants and Toddler Development III.	The results showed that children with severe acute malnutrition experienced motor (75%), language (75%), and cognitive (63%) delays. Sixty-three percent of children with delays experienced delays in total development between the ages of 4 and 7 months.
3.	Fitrah Ernawati, Pusparini, Hardinsyah, Dodik Briawan, Amalia Safitri, & Mutiara Prihatini	To analyze the relationship between linear growth and psychosocial aspects of parenting on toddler cognitive development.	A total of 115 children experienced cognitive developmental delays. Children with persistent nutritional status, classified as stunting, from birth to age 3, experienced cognitive developmental delays.
4.	Partha De & Nandita Chattopadhyay	This study focused on several factors such as child age, gender, birth weight, gestational age and single or twin birth to assess developmental differences in children.	The findings of this study observed that questionable development occurred in children with wasting, moderate, and severely underweight nutritional status. Children with severe stunting experienced developmental delays.
5.	Javeria Saleem, Rubeena Zakar, Gul Mehar Javaid Bukhari, Aneela Fatima & Florian Fischer	To determine the prevalence of developmental delay and its causes in toddlers with severe acute malnutrition without complications in rural Pakistan.	A total of 108 children (61.1%) with severe acute malnutrition (SAM) were suspected of having overall developmental delay. The most frequently delayed developmental domains included personal and social behavior.
6.	Wanze Xie, Sarah KG Jensen, Mark Wade, Swapna Kumar, Alissa Westerlund, Shahria H Kakon, Rashidul	To determine the relationship between stunting and poor cognitive outcomes and the connectivity of brain function can mediate the relationship between child	Unbalanced toddler growth is an indicator of chronic malnutrition which is prospectively related to brain function and cognitive development.

No	Author	Objectives	Results
	Haque, William A Petri & Charles A Nelson	growth and cognitive function.	
7.	Shimelash Bitew Workie, Tesfa Mekonen, Tefera Chane Mekonen & Wubalem Fekadu	Knowing the relationship between children's development and their nutritional status and the known outcomes can be of use to policy makers and program managers in different parts of the country.	Stunting has a significant relationship with communication, gross motor skills, fine motor skills, personal social skills and problem solving.
8.	Sarah Bunker & Jyotsna Pandey	To discuss the pathological consequences of nutritional deficiencies other than vitamin deficiencies and pathological states that have a significant effect on nutritional requirements.	Complications of malnutrition include loss of body mass, muscle weakness, developmental delays, infections and slowed wound healing.
9.	Ingeborg G. Ribe, Erling Svensen, Britt A Lyngmo, Estomih Mduma, & Sven G, Hinderaker	to identify determinants of cognitive development in children living in villages around Haydom, a rural area in north-central Tanzania.	The results of the Z-score analysis of weight-for-age and weight-for-length at 6 months of age were significantly associated with the Bayley gross motor score at 15 months. In other words, malnutrition is associated with stunted gross motor development.
10.	Hasina Rakotomanana, Deana Hildebrand, Gail E. Gates, David G. Thomas, Fanjaniaina Fwbush & Barbara J. Stoeker	To assess the development of children aged 11–13 months in relation to their nutritional status and to examine parental stimulation attitudes and practices at home in the Vakinankaratra region.	This group has very high rates of stunting (>69%), underweight, and wasting. Average cognitive, motor, language, and socioemotional development scores are low, with moderate correlations between fine motor skills, cognitive skills, and receptive and expressive language skills.

Table 3. Developmental delays caused by malnutrition, other factors causing developmental delays, and intervention strategies to improve nutritional status and developmental delays.

No	Author	Children Development	Other Influencing Factor	Intervention Strategy
1.	Mei Lia Nindya Zulis Windyarti, Poppy Fransisca Amelia & Esya Iriandica Al-Ashfiha	4 Developmental Domains (Gross Motor, Fine Motor, Language and Personality)	Chronic diseases, physical and chemical environment, poor sanitation, lack of sunlight, exposure to radioactive substances.	N/I
2.	Navneet Khandelwal, Jagdish Mandliya, Kamma Nigam, Vandana Patil, Aditya Mathur, & Ashish Pathak	3 Developmental Domains (motor, language and cognitive)	LBW, working mothers, BB/U < -3 SD and experiencing severe anemia	Ease of access to nutrition and developmental stimulation for all children with severe acute malnutrition involving mothers and therapists.

No	Author	Children Development	Other Influencing Factor	Intervention Strategy
3.	Fitrah Ernawati, Pusparini, Hardinsyah, Dodik Briawan, Amalia Safitri, & Mutiara Prihatini	Cognitive Developmental Delay (Language Development)	Psychosocial and Environmental Care	Language development stimulation is carried out by everyone, such as mothers, caregivers, family members and groups.
4.	Partha De & Nandita Chattopadhyay	4 Developmental Domains (Gross Motor, Fine Motor, Language and Personality)	Gender and Age	Prevention of malnutrition in children with questionable development needs to start with providing exclusive breastfeeding and introducing semi-solid complementary foods starting from the age of 6 months.
5.	Javeria Saleem, Rubeena Zakar, Gul Mehar Javaid Bukhari, Aneela Fatima & Florian Fischer	Global Development. Social development and social behavior are experiencing the greatest slowdown.	Child age, history of TB, and mixed breastfeeding practices	Effective community-based management of acute malnutrition, including Ready to Use Therapeutic Food (RUTF).
6.	Wanze Xie, Sarah KG Jensen, Mark Wade, Swapna Kumar, Alissa Westerlund, Shahria H Kakon, Rashidul Haque, William A Petri & Charles A Nelson	Cognitive Development	N/I	Providing exclusive breastfeeding for the first 6 months protects children from growth disorders or brain and cognitive development.
7.	Shimelash Bitew Workie, Tesfa Mekonen, Tefera Chane Mekonen & Wubalem Fekadu	Communication, Gross Motor, Fine Motor, Personal Social, & Problem Solving	Providing complementary foods for children under and over 6 months. Lack of dietary diversity.	Nutrition Intervention
8.	Sarah Bunker & Jyotsna Pandey	Cognitive Development	N/I	Provides nutrition to meet sufficient energy or protein requirements for the body.
9.	Ingeborg G. Ribe, Erling Svensen, Britt A Lyngmo, Estomih Mduma, & Sven G, Hinderaker	Gross Motor Development	Status Sosioecomic, Nutritional Status, Gender	N/I
10.	Hasina Rakotomanana, Deana Hildebrand, Gail E. Gates, David G. Thomas, Fanjaniaina Fwbush & Barbara J. Stoeker	Cognitive, Motor, Language, and Sosioemotional Development	Parent-child interaction	Improving Home Stimulation (Parent-child Interaction).

6. Conclusions

Toddlers are the most vulnerable age group because they are easily bored and malnourished. Early childhood is the most crucial developmental phase in life. Poorly managed malnutrition can lead to malnutrition. Malnutrition occurs when nutritional intake does not meet the body's needs for normal functioning. This leads to changes in growth and development in children, resulting in neurological, cognitive, and behavioral complications. Children with malnutrition are at risk of developmental delays in five developmental domains. These developmental delays include underdeveloped gross motor skills, underdeveloped fine motor skills, language, personal social skills, and cognitive skills. Therefore, the first 1,000 days of life, including pregnancy and the first two years of life, are crucial for physical growth and broader cognitive, motor, and socioemotional development.

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