# BREASTFEEDING PRACTICES DURING THE FIRST 1000 DAYS AND THEIR LONG-TERM ASSOCIATION WITH STUNTING IN CHILDREN UNDER FIVE: A SYSTEMATIC LITERATURE REVIEW

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**ABSTRAK: PRAKTIK MENYUSUI SELAMA 1000 HARI PERTAMA KEHIDUPAN DAN KAITANNYA DALAM JANGKA PANJANG DENGAN KEJADIAN STUNTING PADA ANAK DI BAWAH USIA LIMA TAHUN: *A SYSTEMATIC LITERATURE REVIEW***

Latar Belakang: Stunting merupakan masalah kesehatan masyarakat yang masih bertahan di negara-negara berpenghasilan rendah dan menengah, dengan dampak jangka panjang terhadap pertumbuhan fisik dan perkembangan kognitif anak. Praktik menyusui selama 1000 Hari Pertama Kehidupan telah diidentifikasi sebagai faktor penting yang memengaruhi pertumbuhan linear, meskipun hasil penelitian sebelumnya menunjukkan temuan yang beragam.

Tujuan: Penelitian ini bertujuan untuk meninjau secara sistematis bukti terkini mengenai hubungan antara praktik menyusui selama 1000 HPK dengan risiko stunting pada anak di bawah usia lima tahun.

Metode: Tinjauan literatur sistematis dilakukan mengikuti pedoman PRISMA. Pencarian dilakukan pada database PubMed, ScienceDirect, dan ProQuest, dengan batasan tahun terbit 2020–2025. Seleksi artikel menggunakan kerangka PICOS, dan penilaian kualitas menggunakan instrumen dari Joanna Briggs Institute.

Hasil: Sebanyak 12 artikel memenuhi kriteria inklusi. ASI eksklusif secara konsisten dikaitkan dengan penurunan risiko stunting. Inisiasi menyusui dini bersifat protektif, sementara menyusui lebih dari 12 bulan pada keluarga berpenghasilan rendah dikaitkan dengan peningkatan risiko stunting akibat rendahnya keberagaman makanan. MP-ASI yang tidak memadai, berat badan lahir rendah, dan infeksi berulang turut memperburuk risiko.

Kesimpulan: Praktik menyusui yang optimal selama 1000 HPK sangat penting untuk mencegah stunting. Keberhasilan menyusui perlu didukung oleh pendidikan ibu, pemberian MP-ASI yang sesuai, serta intervensi multifaktorial.

Saran: Diperlukan program edukasi yang berkelanjutan bagi ibu mengenai praktik menyusui dan pemberian MP-ASI yang tepat, serta kebijakan yang mendukung intervensi lintas sektor untuk menanggulangi faktor risiko stunting secara komprehensif.

Kata Kunci: menyusui, stunting, 1000 hari, MP-ASI, nutrisi dini, pertumbuhan anak

**ABSTRACT**

Background: Stunting remains a persistent public health issue in low- and middle-income countries, with long-term consequences for children's physical and cognitive development. Breastfeeding during the first 1000 days has been identified as a critical factor influencing linear growth, though previous studies have yielded mixed findings.

Objective: This study aims to systematically review recent evidence on the relationship between breastfeeding practices during the first 1000 days and the risk of stunting among children under five.

Methods: A systematic literature review was conducted using the PRISMA framework. Articles were retrieved from PubMed, ScienceDirect, and ProQuest, limited to studies published between 2020 and 2025. The PICOS model guided the inclusion criteria, and the Joanna Briggs Institute checklist was used for quality appraisal.

Results: Twelve articles met the inclusion criteria. Exclusive breastfeeding was consistently associated with reduced stunting risk. Early initiation of breastfeeding had a protective effect, whereas prolonged breastfeeding beyond 12 months in poor households increased stunting risk, likely due to poor dietary diversity. Inadequate complementary feeding, low birth weight, and recurrent infections further compounded the risk.

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Conclusion: Optimal breastfeeding during the first 1000 days significantly reduces the risk of stunting. However, successful breastfeeding requires maternal education, appropriate complementary feeding, and multifactorial interventions.

Suggestion: Sustainable maternal education programs and integrated policy support are essential to promote optimal feeding practices. Multisectoral interventions addressing nutrition, healthcare access, food security, and sanitation are recommended to effectively reduce stunting rates in vulnerable populations.

Keywords**:** breastfeeding, stunting, 1000 days, complementary feeding, early nutrition, child growth

## INTRODUCTION

The initial 1000-day period, beginning at conception and continuing through the second year of life, is considered a foundational phase for ensuring proper growth and long-term developmental outcomes (Dayani & Widyantari, 2024; Likhar & Patil, 2022). Adequate nutrition during this phase is essential for ensuring optimal physical growth, cognitive development, and immune system function. Nutritional deficiencies during this period can lead to long-term consequences, including stunting— a condition characterized by chronic undernutrition resulting in low height-for-age, which impairs both health and developmental outcomes (Soliman et al., 2021).

Stunting remains a critical global health issue, disproportionately affecting children in low- and middle-income countries. WHO estimates indicate that about 22% of under-five children worldwide suffer from stunting, which may hinder cognitive growth, educational attainment, and future workforce productivity (Rahmadiyah et al., 2024). Hence, effective nutritional interventions during the first 1000 days are vital to prevent stunting and promote healthy growth.

Lactation or breastfeeding plays a pivotal role in providing optimal nutrition during this critical period. Breast milk supplies essential nutrients such as proteins, fats, vitamins, and minerals, along with bioactive components that enhance the infant's immune defenses (Victora et al., 2016). Global health organizations advocate exclusive breastfeeding during the first six months, followed by suitable complementary feeding, as essential practices to promote healthy growth and development in children (UNICEF, 2019). Studies have demonstrated that optimal breastfeeding practices are associated with a reduced risk of stunting by improving nutritional status and decreasing infection rates (Black et al., 2013).

Nevertheless, various factors such as suboptimal breastfeeding practices, delayed or inappropriate introduction of complementary foods, and socio-economic conditions can influence the effectiveness of lactation in preventing stunting. Moreover, previous studies have reported mixed findings regarding the direct relationship between the duration and quality of lactation and the risk of stunting (Horta et al., 2015; Kramer & Kakuma, 2012). Therefore, a systematic review of the current literature is essential to synthesize available evidence, identify patterns, and evaluate the quality of research on the role of the lactation period in the first 1000 days and its association with stunting risk.

This systematic literature review aims to provide a comprehensive understanding of how lactation during the first 1000 days influences stunting risk. The findings are expected to inform policymakers, healthcare providers, and communities in designing effective, evidence-based nutrition interventions to combat stunting.

## RESEARCH METHODS

This research adopted a systematic literature review method guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The study aimed to compile and analyze existing evidence on the relationship between breastfeeding practices during the first 1000 days of life and the risk of stunting in children aged 0 to 59 months across low- and middle-income countries (LMICs).

### Search Strategy

A comprehensive literature search was conducted using three electronic databases: PubMed, ScienceDirect, and ProQuest. The search was limited to peer-reviewed articles published between 2020 and 2025. The following Boolean search terms were used: ("lactation period" OR "exclusive breastfeeding") AND ("stunting" OR "child growth failure") AND ("1000 days" OR "early childhood nutrition").

The search process followed several steps:

1. Identification – Articles were retrieved using predefined search terms.
2. Screening – Duplicates were removed using Zotero reference management software, resulting in a set of unique records.

3. Eligibility – Titles and abstracts were screened against inclusion criteria.
4. Inclusion – Full-text articles were assessed, and those meeting all criteria were included in the final synthesis.

In addition, reference lists of relevant studies were manually screened to identify further eligible articles.

**Eligibility Criteria**

The selection of studies was guided by the PICOS framework, which considers five key components: Population, Intervention, Comparison, Outcome, and Study Design.

**Tabel 1**
**PICO Framework**

| Elements | Inclusion | Exclusion |
|---|---|---|
| **Population** | Children aged 0–59 months (with a focus on the first 1000 days of life) in low- and middle-income countries (LMICs). | Studies involving children above 59 months, animal subjects, or populations outside the first 1000-day context. |
| **Interventions** | Breastfeeding practices during the first 1000 days: exclusive breastfeeding for 0–6 months, early initiation, continued breastfeeding ≥12 months, and age-appropriate complementary feeding. | Studies focusing on feeding practices outside the 1000-day window, or lacking detailed breastfeeding-related data. |
| **Comparison** | Children who were not exclusively breastfed, received formula feeding, breastfed <6 months, or had delayed breastfeeding initiation. | Studies without a clear comparison group or no distinction between breastfeeding and non-breastfeeding practices. |
| **Outcome** | Stunting (height-for-age < -2 SD as per WHO Child Growth Standards). | Studies not reporting stunting as an outcome or using unrelated anthropometric indicators. |
| **Study Design** | Primary studies: quantitative, qualitative, or mixed-method research | Reviews, editorials, opinion pieces, letters to editors, conference abstracts, animal studies, and non-English full-text articles. |

**Study Selection Process**

An initial total of 10,826 records was retrieved from the databases: EBSCO (8,723), PubMed (85), and ProQuest (2,018). After deduplication, 3,142 unique articles remained. A total of 2,780 articles were excluded during the title and abstract screening process. Subsequently, 362 full-text articles were reviewed for eligibility, and 12 studies fulfilled the inclusion criteria and were incorporated into the final synthesis.

Of the selected studies:

- 11 were cross-sectional studies
- 1 was a cluster randomized controlled trial (Soofi et al., 2022)

The article selection process is illustrated in Figure 1 using the PRISMA 2020 flow diagram:

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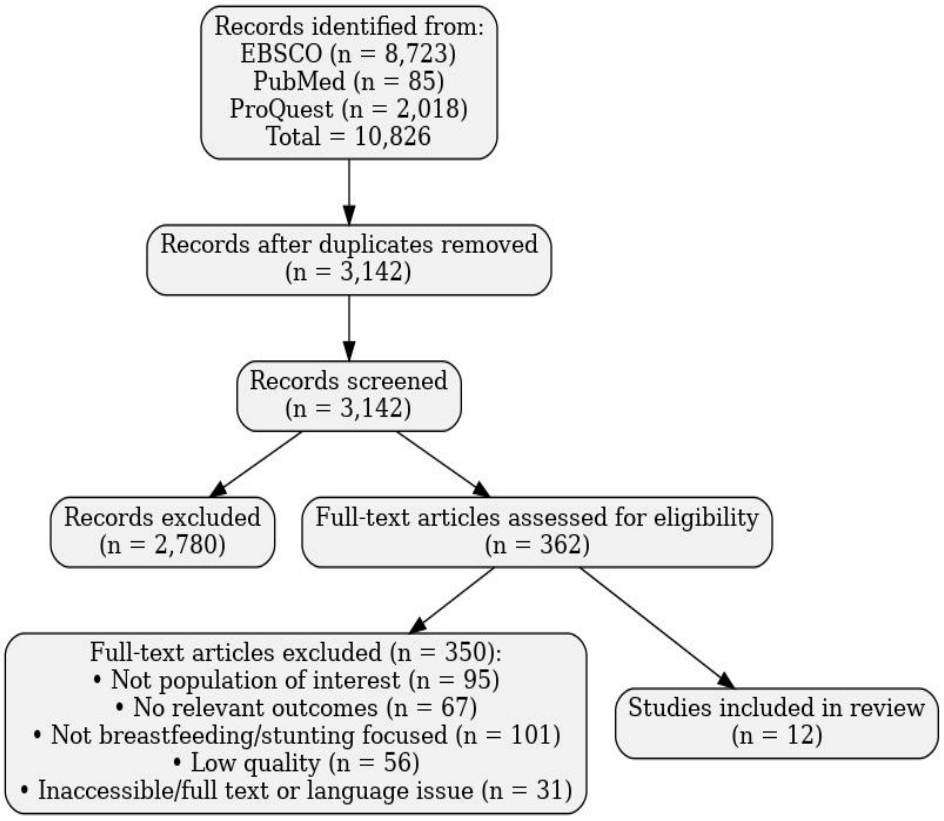


Figure 1. PRISMA Flow Diagram

**Quality Appraisal**

The included studies underwent quality assessment through the application of the Joanna Briggs Institute (JBI) Critical Appraisal Tools. Each study was evaluated using the checklist specific to its design. Studies were graded as follows:

- Grade A (high quality): ≥80% of criteria marked "Yes"
- Grade B (moderate quality): 50–79% "Yes"
- Grade C (low quality): <50% "Yes"

Of the 12 included studies, 9 received Grade A, and 3 received Grade B, indicating good to excellent methodological quality. No studies were excluded based on quality assessment.

**Ethical Considerations**

This review did not require ethical clearance, as it relied exclusively on data obtained from publicly available, peer-reviewed publications. No direct involvement of human participants or animal subjects was undertaken in the conduct of this study.

**RESEARCH RESULT**

A total of 10,826 articles were initially identified through database searches. After duplicate removal, 3,142 unique records were retained for screening. Title and abstract screening excluded 2,780 articles, resulting in 362 full-text studies for eligibility assessment. Of these, 12 studies met all inclusion criteria and were included in the final synthesis.

The included studies consisted of the following research designs:

- 11 cross-sectional studies
- 1 cluster randomized controlled trial

**Table 2**
**Data Extraction**

| Article/Author | Study objectives | Study design | Participants/ Sample Size | Main findings |
|---|---|---|---|---|
| Walters et al. (2019) | • To assess the current status of breastfeeding and complementary feeding practices in Malawi.<br>• To explore maternal factors associated with each Infant and Young Child Feeding (IYCF) indicator.<br>• To investigate the associations between individual IYCF indicators and nutritional outcomes, including stunting, underweight, and wasting. | Cross-sectional | 2294 children aged 0-23 months | • Despite their importance, breastfeeding and complementary feeding practices in Malawi remain below optimal standards, thereby contributing to undernutrition among children.<br>• Maternal factors across five domains showed significant associations with feeding practices, highlighting potential areas for targeted interventions.<br>• Adherence to minimum meal frequency and minimum acceptable diet was linked to a reduced risk of underweight in children aged 13–23 months, although no significant associations were observed with stunting or wasting. |
| Sari et al. (2021) | To examine the relationship between a history of exclusive breastfeeding and the incidence of stunting among children aged 12–23 months in the Banjar Margo District. | Cross-sectional | 193 mothers with children aged 12-23 months | • After adjusting for maternal education and employment status, children who did not receive exclusive breastfeeding were found to have a 3.1-fold increased risk of experiencing stunting compared to those who were exclusively breastfed.<br>• The proportion of stunting among children aged 12–23 months was recorded at 29.5%.<br>• A significant association was observed between exclusive breastfeeding history and the occurrence of stunting. |
| Syeda et al. (2020) | Analyze the relationship between | Cross-sectional | 1072 children aged 0-3 | • The prevalence of underweight, stunting, |

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| | breastfeeding duration and undernutrition among children aged | | years | and wasting among children aged 0-3 years in Pakistan was significant, with stunting being the most prevalent form of undernutrition.<br>• Breastfeeding duration was significantly associated with stunting and severe stunting, but not with wasting or underweight.<br>• Proper antenatal care and maternal education were found to be important factors in reducing undernutrition. |
| Campos et al. (2020) | This study assessed the association between breastfeeding duration (never, <6 months, ≥6 months) and child stunting—defined as a length/height-for-age z-score <–2 SD based on WHO growth standards—considering individual, household, and community-level factors in Mexico | Cross-sectional | 2,089 children aged 6–35 months | • The prevalence of child stunting among adolescent mothers was found to be 16.4%, which is higher than previous studies in Thailand.<br>• Several factors were significantly linked to stunting, including maternal age at delivery, education level, household size, gestational weight gain, infant birth weight, full immunization status, recent illness, breastfeeding practices, and complementary feeding.<br>• Infants who were breastfed for fewer than four months exhibited a higher risk of stunting compared to those breastfed for six months or longer; however, this difference was not statistically significant. |
| Nsereko et al. (2018) | This study aimed to examine the contributing factors to childhood stunting by analyzing feeding practices among Rwandan children aged two years or younger. | Cross-sectional study | 1,634 children ≤ 2 years of age | • 35.1% of the children in the sample were stunted.<br>• Breastfeeding for 1 year was significantly associated with an increased risk of childhood stunting.<br>• Solid food initiation and early initiation to |

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| | | | | breastfeeding were not significantly associated with childhood stunting after controlling for confounders. |
| Hadi et al. (2021) | Examine the protective effect of exclusive breastfeeding against stunting in children under two years old and its interaction with monthly household expenditure. | Cross-sectional | 408 children aged 6–24 months and their caregivers | • Children from low-income families who received exclusive breastfeeding were 20% less likely to experience stunting than those who were not exclusively breastfed.<br>• Among wealthier households, children who were exclusively breastfed had a 50% lower risk of stunting compared to non-exclusively breastfed children from poorer households.<br>• Exclusive breastfeeding serves as a key protective factor against stunting, particularly in socioeconomically disadvantaged populations. |
| Tello et al. (2022) | This study aimed to assess the prevalence of breastfeeding and complementary feeding practices, and to examine their relationship with stunting in Ecuadorian indigenous children under two years old | Cross-sectional | 625 children aged 0-23 months | • The study found a high prevalence of stunting among indigenous children under two years of age, with 26.8% of the children being stunted.<br>• Breastfeeding practices were prevalent but not associated with stunting, while not receiving the minimum meal frequency for age was significantly associated with stunting.<br>• Consumption of foods rich in iron was associated with lower probabilities of stunting in children aged 19 to 23 months. |
| Soofi et al. (2022) | To evaluate the impact of nutritional supplementation provided during the first 1000 days of life on reducing the prevalence of | Cluster randomized controlled trial | 2500 children age 6-23 months | • The administration of WSB+ and LNS-MQ during the first 1000 days contributed to improved linear growth and a reduction in stunting among children at 24 |

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| | stunting in children at 24 months of age. | | | months of age.<br>• The intervention group experienced a notable decline in stunting (10.2%) and underweight (13.7%) prevalence compared to the control group.<br>• No statistically significant difference in wasting prevalence was identified between the intervention and control groups. |
| Safaah et al. (2022) | Investigate the association between exclusive breastfeeding and stunting among children aged 2 to 5 years | Cross-sectional | 109 respondents (mothers with children aged 2-5 years) | • Most children (63%) were not exclusively breastfed, and a high percentage (65.9%) experienced stunting.<br>• Exclusive breastfeeding was found to affect the incidence of stunting, with a significant relationship confirmed by the Chi-Square test.<br>• The study emphasizes the importance of exclusive breastfeeding in the first six months to reduce stunting factors. |
| Lusiana (2019) | This study seeks to examine the association between exclusive breastfeeding practices and maternal stature with the prevalence of stunting among children aged 2 to 5 years at the Barombong Health Center, Gowa District, South Sulawesi. | Cross-sectional | 56 children aged 2-5 years | • A statistically significant association was found between maternal height and stunting among children aged 2–5 years, indicated by a p-value of 0.026.<br>• Exclusive breastfeeding was also significantly associated with the incidence of stunting, with a p-value of 0.015.<br>• The study concludes that a family approach and education on nutritional intake, particularly through exclusive breastfeeding, are crucial in preventing stunting in children. |
| Cetthakrikul et al. (2018) | Assess the factors contributing to stunting among Thai children aged less than five years. | Cross-sectional | A total of 24,119 households and 9716 children age | • Childhood stunting in Thailand is significantly associated with several factors, including household economic |

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| | | | 0-59 months | status and prolonged breastfeeding.<br>• Prolonged breastfeeding beyond 12 months, when combined with poor economic status, increases the risk of stunting.<br>• Children in the poorest households are more likely to experience stunting compared to those in richer households. |
| Andra et al. (2025) | • This study examined the relationship between exclusive breastfeeding, maternal height, and low birth weight with the incidence of stunting among children aged 6–59 months in Baringin District, Sawahlunto City, West Sumatra, Indonesia. | Cross-sectional | 199 children aged 6-59 months | • The prevalence of stunting among children aged 6–59 months was reported at 33.2%.<br>• There was a statistically significant association between stunting and both maternal height (p = 0.002) and low birth weight (p = 0.031).<br>• Exclusive breastfeeding did not demonstrate a significant relationship with stunting, as indicated by a p-value of 0.088. |

A total of 12 studies that met the inclusion criteria were incorporated into the final synthesis, comprising 11 cross-sectional studies and one cluster randomized controlled trial. The studies were conducted in various low- and middle-income countries, including Indonesia, Pakistan, Thailand, Malawi, Rwanda, and Ecuador. Most studies focused on children aged 0–59 months, assessing breastfeeding practices such as exclusive breastfeeding, breastfeeding duration, early initiation, and complementary feeding, and their association with stunting.

Key findings included:

- Children who were not exclusively breastfed had a 1.3 to 3.1 times higher risk of being stunted compared to those who received exclusive breastfeeding.
- Early initiation of breastfeeding showed a protective effect against stunting.
- Prolonged breastfeeding beyond 12 months was associated with increased risk of stunting in children from low-income households, possibly due to delayed complementary feeding or inadequate dietary diversity.
- Complementary feeding that failed to meet minimum meal frequency or dietary diversity was significantly associated with higher rates of stunting.
- Low birth weight and frequent infections (such as diarrhea) were postnatal risk factors that, when combined with suboptimal feeding, increased the risk of growth failure.

**Discussion**

This systematic review highlights the critical role of breastfeeding practices during the first 1000 days of life in mitigating the risk of stunting among children under five years old. Exclusive breastfeeding, early initiation of breastfeeding, and the introduction of age-appropriate complementary feeding emerged as consistent protective factors. These findings reinforce the recommendations by WHO and UNICEF, which advocate exclusive breastfeeding for the first six months followed by

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continued breastfeeding up to two years or beyond, complemented by adequate complementary foods (UNICEF, 2025).

Several studies in this review align with prior meta-analyses conducted by Victora et al (2016) and Black et al (2013), which found that exclusive breastfeeding can reduce the risk of stunting by enhancing immunity and preventing infection-related growth faltering. Early initiation of breastfeeding, which facilitates colostrum intake rich in immunoglobulins and growth factors, has also been shown to lower infant mortality and morbidity—factors directly associated with linear growth outcomes (Debes et al., 2013).

However, this review also surfaces a more complex reality: prolonged breastfeeding (>12 months), particularly in low-income households, was associated with an increased risk of stunting. This paradox has been discussed in previous studies, such as Marquis et al (1997), which suggested that prolonged breastfeeding in food-insecure settings may indicate that children are not receiving adequate complementary foods or that prolonged breastfeeding substitutes rather than complements solid food intake. Thus, it may serve as a proxy for poor dietary diversity and household poverty.

The importance of complementary feeding quality is further emphasized. Studies in this review report that lack of dietary diversity—particularly absence of iron-rich foods—and inadequate meal frequency were strongly linked with stunting, consistent with findings from the Lancet Series on Maternal and Child Nutrition (Lutter et al., 2013). A child who receives only breast milk after six months, without appropriate complementary foods, is at risk of micronutrient deficiencies that impair growth.

Moreover, several studies included in this review point out that contextual factors, such as maternal education, low birth weight, frequency of diarrhea, and rural residence, are significant modifiers of the breastfeeding-stunting relationship. For example, research by Bosnjak & Grgurić (2013) demonstrated that the benefits of breastfeeding on linear growth are most pronounced when coupled with maternal literacy, adequate antenatal care, and access to clean water. Thus, breastfeeding must not be viewed in isolation but rather within a broader framework of maternal-child health and environmental conditions.

This review also underscores that exclusive breastfeeding alone is not a panacea. Without adequate postnatal care, maternal nutrition, and supportive family or community practices, the benefits of breastfeeding may not be fully realized. Multisectoral interventions that combine health education, social protection (e.g., food or cash transfers), and WASH (water, sanitation, hygiene) components are crucial to break the cycle of undernutrition, as noted by Ruel & Alderman (2013).

In conclusion, while breastfeeding remains a cornerstone of early-life nutrition, it must be integrated with interventions that ensure the availability, accessibility, and proper use of complementary foods, as well as the empowerment of caregivers-especially in resource-limited settings.

## CONCLUSION

The systematic review indicates that optimal breastfeeding practices during the first 1000 days of life are associated with a reduced risk of stunting in children under five. Exclusive breastfeeding, timely initiation, and appropriate complementary feeding play a significant role in supporting child growth. However, breastfeeding must be supported by adequate maternal education, antenatal care, and access to nutritious complementary foods to achieve full protective benefits. The interaction between prolonged breastfeeding and poverty also suggests that socio-economic context influences feeding outcomes.

## SUGGESTION

Given the multifactorial nature of stunting and the consistent evidence linking early feeding practices with child growth outcomes, it is imperative to translate these findings into actionable strategies. The following recommendations are proposed to guide policymakers, health practitioners, and community programs in strengthening efforts to prevent stunting, particularly through targeted support during the first 1000 days of life:

- Strengthen education for mothers on the importance of exclusive breastfeeding and early initiation within the first hour after birth.
- Promote timely and adequate complementary feeding starting at six months with nutrient-rich and diverse foods.
- Enhance antenatal and postnatal counseling services to integrate comprehensive nutrition education.
- Address structural barriers such as food insecurity, inadequate sanitation, and limited access to clean water, particularly in rural and low-income communities.
- Encourage policies and programs that adopt a life-course approach, focusing on maternal health, early infant feeding practices, and household food access throughout the critical 1000-day window and beyond.

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