MATERNAL PARENTING PRACTICES IN THE PREVENTION OF STUNTING AMONG CHILDREN UNDER FIVE: A SCOPING REVIEW

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Abstract

Introduction: Stunting remains a critical public health concern, affecting approximately 148 million children globally and contributing to long-term impairments in cognitive development, educational attainment, and economic productivity. Although nutritional interventions have been the traditional focus, increasing evidence underscores the significance of maternal parenting practices such as responsive caregiving, early stimulation, and nurturing care in promoting optimal growth and preventing stunting, particularly in low- and middle-income countries (LMICs). **Objective**: This scoping review aimed to systematically map and synthesize the existing literature on maternal parenting practices associated with the prevention of stunting among children under five in LMICs. **Methods**: Following the Joanna Briggs Institute (JBI) methodology and PRISMA-ScR reporting standards, a comprehensive search was conducted across five databases (PubMed, Scopus, Web of Science, CINAHL, and PsycINFO) and grey literature sources for studies published between January 2015 and April 2025. Studies were included if they examined maternal behaviors related to stunting prevention in community or household contexts. Data were charted using a standardized form and analyzed thematically. **Results**: Sixteen studies were included, encompassing diverse designs such as cross-sectional surveys, randomized trials, and cohort studies. Common themes included maternal self-efficacy, education, and responsive caregiving as influential factors in stunting prevention. Interventions integrating behavioral, nutritional, and psychosocial components showed greater effectiveness. However, heterogeneity in methodology and geographic concentration primarily in Indonesia. **Conclusion:** Maternal parenting practices are crucial to stunting prevention and should be embedded in early childhood development policies. Future research should prioritize longitudinal, context-specific interventions to enhance evidence-based programming in LMICs.

Keywords: stunting, maternal_parenting, responsive_caregiving, early_childhood development, scoping review

1. INTRODUCTION

Stunting remains a persistent global public health challenge, disproportionately affecting children under five years of age in low- and middle-income countries (LMICs). Defined as impaired linear growth due to chronic undernutrition and repeated infection, stunting impacts approximately 148 million children globally as of 2023, with the highest prevalence found in South Asia and Sub-Saharan Africa [1]. Beyond physical consequences, stunting is associated with long-term cognitive delays, reduced educational attainment, and diminished economic productivity in adulthood [2]. Although the biological and nutritional determinants of

stunting are well-established, emerging evidence highlights the critical influence of psychosocial and behavioral factors, particularly maternal parenting practices, on child growth and development [3,4].

While interventions targeting nutrition and sanitation have shown modest improvements in growth outcomes, the integration of nurturing care, comprising responsive caregiving, stimulation, and protection from adversity, is increasingly recognized as essential to break the intergenerational cycle of undernutrition [5,6]. However, the specific role of maternal parenting behaviors, including feeding styles, responsive interaction, and caregiving routines, in the prevention of stunting remains underexplored in the literature. Existing studies are diverse in design and focus, with limited synthesis of how parenting strategies are conceptualized, implemented, and associated with stunting outcomes across different cultural and socioeconomic contexts.

This knowledge gap presents a significant barrier to designing effective, contextually appropriate interventions that address both the biological and psychosocial dimensions of child undernutrition. Moreover, current evidence is fragmented, with no comprehensive review mapping the range and nature of maternal parenting practices within the context of stunting prevention. Understanding how these practices are defined, measured, and linked to growth outcomes is essential for guiding future research, informing policy, and strengthening integrated child health programming.

Given the complexity and multidimensionality of parenting practices, a scoping review is methodologically appropriate to examine the breadth of available evidence and identify knowledge gaps. Following the Joanna Briggs Institute (JBI) methodology for scoping reviews [7] and the PRISMA-ScR reporting guidelines [8], this approach allows for a

domains without limiting inclusion based on methodological rigor. Unlike systematic reviews or meta-analyses, which aim to assess effect sizes or evaluate intervention efficacy, a scoping review is particularly suited to clarify conceptual boundaries and summarize heterogeneous literature across disciplines and settings.

The objective of this review is to systematically map and synthesize existing evidence on maternal parenting practices in the prevention of stunting among children under five in LMICs, with the aim of identifying key themes, research gaps, and implications for practice and policy.

2. METHODOLOGY

Study Design And Framework

This scoping review was conducted to systematically explore the breadth and characteristics of available evidence concerning maternal parenting practices in the prevention of stunting among children under five. The methodological approach followed the established framework proposed by Arksey and O'Malley, which provides a systematic structure for scoping reviews [9] . This framework was further refined using enhancements introduced by Levac et al. to ensure greater analytical clarity and methodological rigor [10]. The reporting of this review adheres to the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) checklist, ensuring transparency and consistency across all stages of the review process.

Eligibility Criteria

Eligibility criteria were based on the Population–Concept–Context (PCC) framework. The population included mothers or female caregivers of children under five. The concept focused on maternal parenting practices linked to stunting prevention, and the context was limited to LMICs in community or household settings. Eligible studies were empirical (qualitative, quantitative, or mixed-

methods), published in English between January 2015 and April 2025 in peer-reviewed journals or grey literature. Non-empirical articles, non-English publications, and abstracts without full text were excluded..

Information Sources and Search Strategy

A comprehensive literature search was conducted across multiple electronic databases, including PubMed, Scopus, Web of Science, CINAHL, and PsycINFO. Additionally, grey literature was explored using sources such as Google Scholar and ProQuest Dissertations & Theses, and reference lists of included articles were manually screened to identify any additional relevant studies. The final database search was completed on April 30, 2025.
The search strategy was developed in consultation with a health sciences librarian and utilized a combination of Medical Subject Headings (MeSH), free-text keywords, and Boolean operators tailored to each database. Search terms included variations of “parenting practices,” “maternal behavior,” “child nutrition,” “stunting,” “child growth,” and “early childhood.” The full search strategy for each database is available upon request.

Selection of Sources of Evidence

The selection process involved a two-stage screening procedure. Initially, titles and abstracts were independently reviewed by two researchers to identify potentially relevant studies. Full-text articles of selected citations were subsequently retrieved and assessed for inclusion based on the predetermined eligibility criteria. Discrepancies between reviewers during either stage were resolved through discussion and consensus, and a third reviewer was consulted when necessary.

All records were managed using EndNote X9 for reference management and deduplication. The screening process was facilitated using Rayyan, a web-based tool for systematic reviews, which allowed for blind screening and conflict resolution.

Data Charting Process

Data extraction was conducted using a pre-tested standardized charting form. Extracted variables included author, year, setting, study design, population characteristics, parenting practices, stunting-related outcomes, and key findings. Two reviewers independently charted the data, resolving discrepancies through discussion to ensure accuracy

Ethical Considerations

Ethical approval was not required for this review, as the analysis was based solely on publicly available data from previously published literature. No human subjects were involved directly in the conduct of this study

3. RESULTS

Searching results

A total of 4,637 records were identified through database searching (n = 4,125) and additional sources such as registers and grey literature (n = 512). After removing 1,324 duplicates, 3,313 records were screened based on titles and abstracts. Of these, 3,120 records were excluded for not meeting the inclusion criteria. Full-text retrieval was attempted for 193 reports, of which 13 could not be retrieved. Subsequently, 180 reports were assessed for eligibility, and 164 were excluded for reasons including irrelevance to the population, concept, or context (n = 102), inappropriate publication types (n = 38), non-English full texts (n = 6), and biomedical-only focus without relevant parenting components (n = 18). Ultimately, 16 studies met all eligibility criteria and were included in the final synthesis.

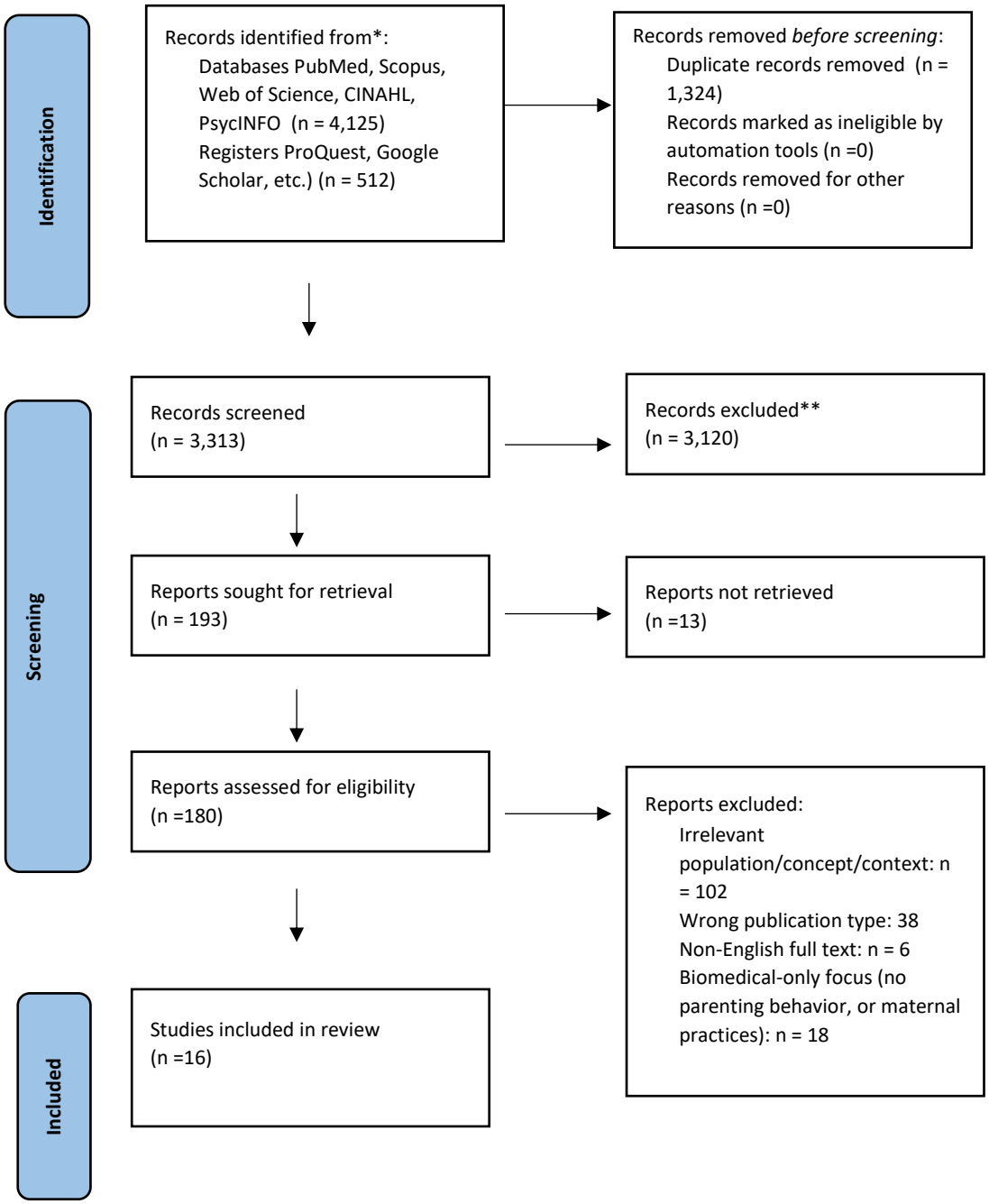

Figure 1 : PRISMA 2020 flow diagram

Characteristics of included studies

The 17 studies included in this review exhibit a diverse range of methodological designs, geographic settings, target populations, intervention strategies, and outcome domains. The majority of studies were conducted in low- and middle-income countries (LMICs), with Indonesia being the most

frequently represented setting [11,12,13,14,15,16,17]. Other studies were set in broader LMIC contexts such as Sub-Saharan Africa [18], , rural Uganda [19] and multi-country global analyses [20, 21, 22,23]

Methodologically, the studies encompassed a wide array of approaches, including cross-sectional analyses [16,18], longitudinal cohort designs [11], cluster-randomized controlled trials [19], case-control with structural equation modeling [15], and systematic reviews with meta-analysis [23]. One study employed a concept analysis to define maternal self-efficacy in nutrition [12], while another utilized a global expert consultation process for priority-setting in early childhood development research [24].

Regarding population focus, most studies targeted mothers or female caregivers of children under five, with particular attention to those experiencing stunting or at risk of undernutrition. Sample sizes varied considerably, from small-scale local studies involving 30–70 participants [13, 14], to large-scale secondary analyses of national survey data comprising over 170,000 children [4].

Intervention characteristics also varied in scope and complexity. Several studies evaluated parenting or psychosocial stimulation interventions [19, 23], while others assessed the impact of nutritional support strategies, such as small-quantity lipid-based nutrient supplements or cash-plus programs [20, 23]. A number of studies did not test interventions directly but instead analyzed determinants of stunting or parenting practices, focusing on factors such as maternal education, responsive caregiving, and household environment [15, 18, 22].

Across the studies, outcome domains clustered around linear growth (as measured by stunting or height-for-age z-scores), early childhood development (ECD) indicators, and caregiver knowledge or behaviors. While some interventions demonstrated significant improvements in parenting practices and cognitive development [19, 3], the effect on stunting was less consistent. Notably, Dewey et al. (2019) and Little et al. (2021) reported reductions in stunting when nutritional interventions were combined with behavior change components [20, 23].

In summary, the body of evidence reflects a growing emphasis on integrated approaches that address both nutritional and psychosocial domains of child development. However, heterogeneity in study design, population characteristics, and intervention delivery underscores the need for context-specific strategies and further implementation research

Key Findings

Thematic analysis of the included studies revealed that maternal parenting practices-particularly responsive caregiving, maternal education, and nutritional behavior-play a critical role in influencing child growth and preventing stunting. Several studies demonstrated strong links between psychosocial stimulation and cognitive as well as linear growth outcomes [3, 11]. Maternal self-efficacy and knowledge were also found to be essential determinants of positive parenting, often influenced by education level and exposure to health information [12, 14, 18].

The reviewed literature employed diverse methodologies, including cross-sectional surveys, longitudinal cohorts, randomized trials, and meta-analyses, reflecting both observational and interventional approaches. Most studies were conducted in Indonesia, with additional research from Sub-Saharan Africa and other LMICs, indicating a regional focus on stunting prevention.

Multicomponent interventions-integrating nutritional, behavioral, and psychosocial elements-were the most effective in improving child outcomes [20,23]. Conversely, single-focus interventions showed limited impact, underscoring the need for comprehensive strategies. Notably, maternal education, socioeconomic status, and access to health services consistently emerged as key enablers of effective parenting and improved child growth.

Risk of Bias Interpretation

Although a formal critical appraisal was not conducted, an evaluation of methodological characteristics across the 16 included studies suggests a moderate variability in risk of bias, primarily influenced by study design, sample size, and data collection methods. Several studies employed robust designs such as randomized controlled trials [19,20] and longitudinal cohort approaches [11], which typically reduce bias through prospective data collection, randomization, or temporal association. These

studies offer higher internal validity and more reliable estimates of causal relationships between parenting interventions and child outcomes.

However, a large proportion of the included evidence relied on cross-sectional surveys [13,14,16,17], which are inherently more susceptible to biases related to temporality, self-reporting, and confounding. These limitations restrict causal inference and may lead to overestimation or underestimation of associations. Furthermore, sample sizes varied substantially across studies, from as few as 30 participants [13] to more than 170,000 [5] reflecting heterogeneity in statistical power and generalizability. Conceptual or theoretical studies [12, 24] did not include empirical data and thus were not subject to traditional bias assessments; however, their inclusion in the scoping review remains valuable for identifying conceptual clarity and guiding frameworks.

In summary, while the evidence base includes methodologically rigorous trials that reduce risk of bias, the dominance of observational and secondary data studies suggests a moderate overall risk of bias. This highlights the need for future research to prioritize prospective, well-powered designs and minimize confounding through multivariable analyses or randomization, particularly when evaluating the complex interplay between maternal behaviors and stunting outcomes.

4. DISCUSSION

This scoping review synthesizes evidence on maternal parenting practices in preventing stunting among children under five in low- and middle-income countries (LMICs), based on 17 studies from 2015–2025. Parenting behaviors—particularly responsive caregiving and early stimulation—emerged as critical determinants of linear growth and cognitive development, especially during the first 1,000 days of life [3,4,11, 21].

Responsive caregiving, when paired with psychosocial stimulation, was associated with reduced risk of developmental delay in stunted children [3,4]. Empowering maternal knowledge, self-efficacy, and autonomy further strengthened child health outcomes [12,13, 25]. although these were often influenced by education and socioeconomic status [18].

Integrated interventions such as small-quantity lipid-based nutrient supplements (SQ-LNS) combined with behavior change communication [20] or “cash-plus” programs [23], showed the strongest impact. In contrast, isolated educational approaches showed limited efficacy in reducing stunting [17], underscoring the importance of multifactorial strategies.

Methodologically, study designs varied from RCTs to cross-sectional analyses, limiting causal inference and cross-study comparability. Notably, most studies originated from Southeast Asia, particularly Indonesia, with less representation from other LMIC regions, raising concerns about generalizability [16,19, 24]. Despite growing recognition of parenting as a modifiable factor in child development [13,19], gaps remain in long-term evaluation, standardized measurement, and inclusion of paternal roles. Future studies should adopt longitudinal, theory-driven designs to assess the sustainability of parenting interventions across diverse sociocultural contexts.

Embedding parenting support within maternal-child health programs, including antenatal/postnatal care and cash transfer schemes, may optimize reach and effectiveness. Culturally sensitive adaptations are also essential for addressing inequities in both LMIC and high-income settings.

5. CONCLUSIONS

Maternal parenting practices, particularly those that are responsive, stimulating, and grounded in nutritional knowledge and empowerment, a significant role in preventing stunting in low and middle-income countries. Multisectoral interventions that integrate behavioral, nutritional, and psychosocial

components are more effective than single-focus approaches. However, limitations in study design and geographic representation highlight the need for stronger theory-based longitudinal research. Integrating parenting support into maternal and child health services and conditional social assistance programs presents a promising strategy.

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Table 1. Characteristics of included studies and summary of findings

Author(s)	Year of Publication	Country or Setting	Study Design	Population Characteristics	Description of the Intervention or Program	Outcomes Related to Stunting and Parenting Capacities	Key Findings
Fitrah Ernawati et al.	2020	Indonesia (Bogor)	Longitudinal study	Pregnant women followed through until children aged 3 years; N=150 with complete data	Observation of linear growth and caregiving quality; psychosocial caregiving measured with HOME Inventory; cognitive assessed using Bayley III	Stunting at age 3 and poor caregiving associated with cognitive delays	Children stunted at age 3 and those with poor psychosocial caregiving had 3x greater risk for cognitive delay
Uswatul Khasanah et al.	2024	Indonesia	Concept analysis	Mothers with children aged 0–24 months (conceptual, not empirical)	Self-efficacy components in maternal nutritional care analyzed via Walker and Avant's concept analysis	Theoretical basis for understanding self-efficacy related to child nutrition and parenting behavior	Strong maternal self-efficacy linked to better nutritional practices and potentially improved child growth outcomes
Murdiningsih & Nurul Komariah	2019	Indonesia (Palembang)	Cross-sectional study	30 toddlers attending pre-school class and their mothers	Measured parenting pattern with PSQ, knowledge questionnaire, and child development via KPSP	Significant correlation between mother's knowledge and parenting with growth and development (p=0.047, p=0.001)	Authoritative parenting and good maternal knowledge associated with better child development and growth outcomes
Maureen M. Black et al.	2015	Multi-country LMICs	Review of observational and	Children under 5 years old, including those in Young Lives cohort	Integrated interventions on nutrition and early learning; reviewed	Positive impacts on both linear growth and	Integrated programs (nutrition +

			interventional studies		home-visiting, preschool programs	cognitive development beyond first 1000 days	stimulation) post-1000 days yield cognitive and physical growth improvements
Chunling Lu et al.	2020	135 LMICs from DHS/MICS	Secondary data analysis (cross-national)	Children aged 36–59 months	Assessment of inequalities in ECD indicators: stunting, early education, home stimulation, ECDI	Large disparities in stunting exposure and caregiving practices between rural/urban and poor/wealthy households	Poorest and rural children most disadvantaged; ECD gaps persist; highlights areas for policy intervention
Joshua Jeong et al.	2025	41 LMICs	Cross-sectional study	173,416 children aged 36–59 months	Not an intervention study; analysis of co-occurrence of stunting and off-track ECD and associations with nurturing care and socioeconomic factors	1 in 6 children experienced both stunting and off-track ECD; co-occurrence more common among poor, rural, less educated, and under-stimulated children	Top predictors: poorest wealth, no early education, low maternal education, no toys, and diarrhea; supports multisectoral policy to address double burden
Mark Tomlinson et al.	2019	Global	CHNRI priority-setting exercise	348 global/local ECD experts (not empirical population)	Research priority setting for ECD improvement using CHNRI methodology	Identified gaps and future research priorities in ECD, emphasizing nurturing care and integrated strategies	Top priorities: nurturing care, training non-specialist workers, integration of services, scalable interventions
Agus Santosa et al.	2022	Indonesia (Purbalingga)	Case-control study with PLS-SEM	132 stunted and 132 non-stunted children, aged 2–5 years	No intervention; analysis of maternal and child factors incl. nutrition, breastfeeding, formula feeding	Maternal factors explained 30.3%, child factors 49.8% of stunting variation	Maternal health and feeding practices crucial; child factors

							mediated by maternal behavior
Fitri Haryanti et al.	2024	Indonesia (Kulon Progo)	Cross-sectional study	73 mothers of stunted children aged 6–23 months	Assessed maternal knowledge of nurturing care (responsive care, early learning, etc.)	Knowledge correlated with maternal education, income, and prior exposure to parenting information	Higher education and exposure linked to better caregiving knowledge
Mulia Saputra et al.	2022	Indonesia (Bandung City)	Cross-sectional study using logistic regression	50 stunted children aged 24–59 months and their mothers	Determinants of stunting: feeding, psychosocial stimulation, education, income	Feeding and stimulation significantly associated with stunting	Maternal education programs needed to improve feeding and caregiving
Benedetta Pongiglione et al.	2023	23 LMICs	Secondary data analysis	105,894 children aged 36–59 months	Examined stunting and child development co-occurrence (ECDI) and predictors	25% of children had both stunting and poor development	Integrated nutrition and stimulation interventions recommended
Bliznashka et al.	2021	Sub-Saharan Africa (9 countries)	Cross-sectional analysis of DHS	21,434 mother–child pairs	Explored women's empowerment and association with ECD and nutrition	Higher empowerment linked to better dietary diversity and stimulation	Empowerment supports better development and nutritional outcomes
Novitasari & Wanda	2020	Indonesia (Depok)	Cross-sectional correlation study	262 toddlers aged 2–5 years and their mothers	Assessed maternal feeding practices using FPSQ-28	No significant relationship found with stunting	Non-responsive feeding common; highlights need for responsive feeding education
Little et al.	2021	10 LMICs	Systematic review and meta-analysis	Children under 5 years (various studies)	Cash-plus programs: cash + BCC, food, health, stimulation, child protection	Cash + food transfers reduced stunting; limited	Cash plus food/health interventions more

						effect from other combinations	effective than cash alone
Singla et al.	2021	Rural uganda	Cluster RCT	511 caregiver–child dyads aged 6–18 months	12-session parenting group via CHWs: stimulation, parenting, nutrition, protection	Improved ECD scores, no effect on stunting	Feasible for parenting, but limited growth impact; needs integration with health/nutrition
Dewey, Adu-Afarwuah, Arimond, et al.	2019	Bangladesh, Burkina Faso, Ghana, Haiti, Kenya, Madagascar, Malawi	Randomized Controlled Trials (Multi-country pooled analysis)	Over 37,000 children and their caregivers in 13 trials across 7 countries	Provision of small-quantity lipid-based nutrient supplements (SQ-LNS) during the first 1000 days, combined with social and behavior change communication (SBCC) on IYCF and hygiene; some included home visits or group sessions	SQ-LNS interventions improved linear growth and reduced stunting in several trials; SBCC improved feeding and hygiene practices	Pooled results showed positive effects on child growth and parenting behaviors; highlighted the importance of combining nutrition supplements with SBCC strategies