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The Relationship Between Maternal Nutrition Knowledge and Education and Child Nutritional Status: A Systematic Literature Review

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ABSTRACT
Child malnutrition remains a persistent public health problem in low- and middle-income countries, with maternal-related factors widely recognized as key determinants of child nutritional outcomes. In a broad context, disparities in maternal education and nutrition knowledge have been linked to inappropriate feeding practices and poor child growth. The purpose of this study was to systematically examine the relationship between maternal nutrition knowledge, maternal education, and child nutritional status, with the hypothesis that both factors are positively associated with improved child nutrition outcomes. The methods involved a systematic literature review of 16 peer-reviewed journal articles published between 2005 and 2025. The reviewed studies were conducted in diverse geographical settings, including Sub-Saharan Africa, South Asia, Southeast Asia, the Middle East, and Indonesia, and involved mothers and children under five years of ageThe results indicate that higher maternal nutrition knowledge is consistently associated with better child nutritional status, including higher HAZ and WAZ scores and lower prevalence of stunting and underweight, even after controlling for socioeconomic and demographic factors. Maternal education also shows a significant positive association, largely through indirect pathways such as improved health literacy and caregiving capacity. The implications of these findings suggest that nutrition-sensitive policies and programs should integrate maternal nutrition education with broader strategies addressing poverty, food security, and access to health services. In conclusion, maternal nutrition knowledge and education are complementary determinants of child nutritional status, and future research should prioritize longitudinal and intervention-based studies to strengthen causal evidence and inform effective nutrition interventions.

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INTRODUCTION

Child malnutrition remains one of the most persistent and complex public health challenges worldwide, particularly in low- and middle-income countries. Despite global commitments to reduce undernutrition, millions of children continue to experience growth faltering during early life. According to the World Health Organization (WHO) and UNICEF, undernutrition contributes to approximately 45% of deaths among children under five years of age, highlighting its profound impact on child survival and development (WHO, 2025). Beyond mortality, malnutrition during early childhood is strongly associated with long-term adverse consequences, including impaired cognitive development, reduced educational attainment, increased susceptibility to chronic diseases, and lower productivity in adulthood (Rezaeizadeh et al., 2024).

The first 1,000 days of life from conception through the first two years—are widely recognized as a critical window for physical growth and neurodevelopment. Nutritional deficiencies during this period may result in stunting, wasting, and underweight, conditions that are often irreversible once established (Rezaeizadeh et al., 2024). Consequently, identifying modifiable determinants of child nutritional status during early life remains a key priority in global health research and policy. Among the various determinants of child nutrition, maternal characteristics play a central role. Mothers are typically the primary caregivers responsible for feeding practices, dietary choices, and health-related decision-making for young children. Extensive empirical evidence suggests that maternal education is a crucial socio-demographic factor influencing child nutritional outcomes. Higher levels of maternal education have been consistently associated with better child anthropometric indicators, including improved height for age and weight for age scores (Rezaeizadeh et al., 2024). Educated mothers are generally more likely to access health services, understand health information, and adopt appropriate childcare practices.

However, growing evidence indicates that maternal education alone may not sufficiently explain variations in child nutritional status across different contexts. In several low-resource settings, children of mothers with limited formal education have demonstrated adequate nutritional outcomes when mothers possess sufficient nutrition-related knowledge (Appoh & Krekling, 2005). This observation has shifted scholarly attention toward maternal nutrition knowledge as a distinct and potentially more proximal determinant of child nutritional status.

Maternal nutrition knowledge refers to a mother's understanding of appropriate dietary intake, breastfeeding practices, complementary feeding, micronutrient requirements, food hygiene, and illness-related feeding behaviors. Unlike formal education, which reflects general cognitive and social competencies, nutrition knowledge is context-specific and directly applicable to everyday caregiving decisions. Studies conducted in Sub-Saharan Africa, South Asia, and Southeast Asia have shown that maternal nutrition knowledge is positively associated with dietary diversity, meal frequency, and adherence to recommended infant and young child feeding practices (Prasetyo et al., 2023).

Several empirical studies suggest that maternal nutrition knowledge may exert an independent effect on child nutritional status, even after controlling for maternal education and household socio-economic status. For instance, Appoh & Krekling, (2005) found that maternal nutrition knowledge significantly predicted child nutritional outcomes in Ghana, whereas formal maternal education did not remain significant in multivariate analysis. These findings suggest that

targeted nutrition knowledge may play a more direct role in shaping feeding behaviors that influence child growth.

Nevertheless, the relationship between maternal nutrition knowledge, maternal education, and child nutritional status is not uniformly consistent across studies. Some research reports strong positive associations, while others find weak or non-significant relationships, particularly when structural constraints such as poverty, food insecurity, and limited access to health services are present (Masilela & Modjadji, 2023). In such contexts, adequate nutrition knowledge may not translate into improved nutritional outcomes if households lack the resources necessary to implement optimal feeding practices.

Intervention based studies further illustrate this complexity. Nutrition education interventions aimed at improving maternal knowledge have demonstrated consistent improvements in knowledge levels and feeding behaviors; however, their effects on child anthropometric outcomes are mixed. While some randomized controlled trials report modest improvements in height-for-age or weight-for-age indicators, others observe changes primarily in dietary practices without significant improvements in growth outcomes (Appoh & Krekling, 2005). These findings suggest that nutrition knowledge may function as a necessary but insufficient condition for improving child nutritional status.

Moreover, the pathways linking maternal education and nutrition knowledge to child nutritional outcomes are often mediated or moderated by contextual factors, including household income, maternal autonomy, cultural feeding norms, and health system accessibility. In resource-constrained environments, maternal education may influence child nutrition indirectly through enhanced access to information and services, whereas nutrition knowledge may operate more directly through feeding practices (Abua et al., 2025).

Despite a substantial body of research examining maternal education, nutrition knowledge, and child nutritional status, the literature remains fragmented. Many studies focus exclusively on either maternal education or nutrition knowledge, without systematically comparing their relative contributions or examining their interaction. Additionally, existing reviews often emphasize intervention effectiveness rather than synthesizing evidence from both observational and experimental studies. Methodological heterogeneity such as differences in knowledge measurement tools, nutritional indicators, age groups, and analytical approaches further complicates efforts to draw generalizable conclusions.

Given these gaps, a comprehensive systematic literature review is warranted to critically synthesize existing evidence on the relationship between maternal nutrition knowledge, maternal education, and child nutritional status. This review aims to integrate findings from diverse settings and study designs to clarify the strength, direction, and contextual variability of these relationships. By doing so, it seeks to inform evidence-based maternal and child nutrition policies and support the design of targeted interventions that address both educational and knowledge-related determinants of child nutrition.

Therefore, this systematic literature review aims to critically examine and integrate findings from observational and intervention-based studies to assess the strength, direction, and contextual variability of the relationships between maternal nutrition knowledge, maternal education, and child nutritional status. By synthesizing evidence from multiple geographical regions and

methodological approaches, this review seeks to provide a more comprehensive understanding that can inform maternal and child nutrition policies and guide the development of targeted, context-sensitive interventions.

METHODS

This study employed a systematic literature review design to examine the relationship between maternal nutrition knowledge, maternal education, and child nutritional status. The review process was conducted in accordance with established systematic review guidelines to ensure transparency and rigor. Relevant peer-reviewed articles were identified through comprehensive searches of international scientific databases, including PubMed, ScienceDirect, SpringerLink, and Google Scholar. The search strategy utilized combinations of keywords such as *"maternal nutrition knowledge," "maternal education," "child nutritional status," "child malnutrition," "stunting," "undernutrition,"* and *"infant and young child feeding,"* using Boolean operators (AND/OR). Inclusion criteria were: (1) original research articles published in English; (2) studies focusing on mothers and children under five years of age; (3) studies examining maternal education and/or maternal nutrition knowledge in relation to child nutritional outcomes; and (4) articles published in peer-reviewed international journals. Exclusion criteria included review articles, conference abstracts, editorials, non-English publications, and studies lacking clear nutritional outcome measures. After removing duplicates, titles and abstracts were screened for relevance, followed by full-text assessment to determine eligibility. Data extraction focused on author(s), publication year, country, study design, sample characteristics, key variables, and main findings related to maternal education, nutrition knowledge, and child nutritional status. The selected studies were then analyzed and synthesized narratively to identify consistent patterns, discrepancies, and contextual factors influencing the observed relationships.

RESULTS

1. Association Between Maternal Nutrition Knowledge and Child Nutritional Status

Across the reviewed literature, maternal nutrition knowledge demonstrated a consistent and generally positive association with child nutritional status. Twelve of the sixteen international studies reported that higher levels of maternal nutrition knowledge were significantly associated with improved child growth outcomes, including higher HAZ and WAZ scores and a lower prevalence of stunting and underweight (Appoh & Krekling, 2005). These findings suggest that maternal understanding of nutrition-related information plays a crucial role in shaping day-to-day caregiving decisions that directly influence child growth and development.

Mothers who possessed adequate knowledge regarding exclusive breastfeeding, appropriate complementary feeding, dietary diversity, meal frequency, and micronutrient intake were consistently more likely to provide nutritionally adequate diets for their children. Adequate maternal nutrition knowledge was also associated with better timing of complementary feeding introduction and more responsive feeding practices, which are essential for meeting children's increasing nutritional requirements. These feeding practices were directly associated with better anthropometric outcomes, particularly during the first two years of life, which is widely recognized as a critical window for physical growth and cognitive development. During this period, inadequate

nutrition may result in irreversible growth faltering, emphasizing the importance of maternal knowledge in preventing early-life malnutrition.

Evidence from Indonesian studies supports these findings, showing that maternal nutrition knowledge is positively associated with child dietary diversity and reduced risk of stunting, especially in rural and low-income households (Paramashanti & Benita, 2020). Indonesian research further highlights that mothers with higher nutrition knowledge are more likely to utilize community-based nutrition services, such as Posyandu, and to follow national infant and young child feeding guidelines (Apostolopoulou et al., 2024).

Several studies further reported that maternal nutrition knowledge remained a statistically significant predictor of child nutritional status even after adjusting for potential confounders such as household income, maternal age, parity, and access to health services (Ernawati et al., 2025). This finding indicates that nutrition knowledge exerts an independent effect on child nutritional outcomes beyond structural socioeconomic factors. However, four studies reported weak or non-significant associations between maternal nutrition knowledge and child anthropometric outcomes. These findings were predominantly observed in settings characterized by severe poverty, food insecurity, and limited access to health services, where structural constraints reduced the ability of mothers to translate knowledge into effective feeding practices (Masilela & Modjadji, 2023). In such contexts, knowledge alone was insufficient to overcome barriers related to food availability, affordability, and household resource allocation. Similar patterns were observed in some Indonesian contexts, where adequate maternal knowledge did not always correspond to improved child nutritional status due to economic limitations and food availability constraints (Mediani et al., 2023).

2. Association Between Maternal Education and Child Nutritional Status

Maternal education was identified as a strong and consistent determinant of child nutritional outcomes across the reviewed studies. Thirteen studies reported a significant positive association between higher levels of maternal education and improved child nutritional indicators, including reduced risks of stunting and underweight as well as improved linear growth (Rezaeizadeh et al., 2024). Maternal education was consistently associated with enhanced problem-solving skills, greater exposure to health information, and increased capacity to interpret nutrition-related messages (Diniayuningrum & Hudaya, 2024).

Educated mothers were more likely to access health information, utilize maternal and child health services, and adhere to recommended infant and young child feeding practices. They were also more likely to engage in preventive health behaviors, such as regular growth monitoring and timely immunization, which indirectly support optimal nutritional outcomes (Kadi et al., 2025). In addition, maternal education was frequently associated with higher household socioeconomic status, improved sanitation, and greater decision-making autonomy, all of which indirectly contributed to better child nutritional outcomes. Indonesian studies similarly reported that children born to mothers with higher educational attainment were less likely to experience stunting and underweight (Grantham-McGregor et al., 2007). These findings align with evidence suggesting that maternal education contributes to improved child nutrition through both behavioral and environmental pathways.

Nevertheless, several studies indicated that the direct effect of maternal education on child nutritional status diminished after controlling for maternal nutrition knowledge and household wealth (Rusdi et al., 2024). This suggests that formal education alone does not automatically translate into improved nutritional outcomes unless it is accompanied by relevant and applicable nutrition knowledge (Arisanti et al., 2025). This finding suggests that maternal education may influence child nutrition primarily through intermediary mechanisms such as improved health literacy, knowledge acquisition, and caregiving capacity rather than through a direct causal pathway (Appoh & Krekling, 2005).

3. Comparative Effects of Maternal Education and Nutrition Knowledge

A substantial proportion of the reviewed studies examined the relative and combined effects of maternal education and maternal nutrition knowledge. Eight studies reported that maternal nutrition knowledge partially mediated the relationship between maternal education and child nutritional status, indicating that formal education enhances a mother's ability to obtain, comprehend, and apply nutrition-related information effectively (Prasetyo et al., 2023). In this context, maternal education functions as an enabling factor that facilitates the acquisition of nutrition-specific knowledge, which in turn directly influences feeding practices and dietary choices.

Intervention-based studies consistently demonstrated significant improvements in maternal nutrition knowledge following nutrition education programs (Nurwasilah et al., 2024). These interventions were effective in increasing awareness of optimal feeding practices, food hygiene, and micronutrient needs. However, the impact of these interventions on child anthropometric outcomes varied across settings. Some studies reported modest improvements in growth indicators, while others observed changes primarily in feeding behaviors without statistically significant improvements in nutritional status (Rezaeizadeh et al., 2024). These findings indicate that maternal nutrition knowledge is a necessary but not sufficient condition for improving child nutritional status, particularly in resource-limited environments where broader socioeconomic and food system constraints persist.

DISCUSSION

This systematic literature review aimed to synthesize existing evidence on the relationship between maternal nutrition knowledge, maternal education, and child nutritional status. The findings of this review indicate that both maternal nutrition knowledge and maternal education play important and interrelated roles in shaping child nutritional outcomes, although their mechanisms of influence differ across contexts.

The results demonstrate that maternal nutrition knowledge is consistently associated with improved child nutritional status, particularly in relation to reduced stunting and underweight. This finding is in line with previous empirical studies which emphasize that nutrition-specific knowledge directly influences maternal feeding practices, dietary diversity, and adherence to recommended infant and young child feeding guidelines (Appoh & Krekling, 2005; Prasetyo et al., 2023). From a behavioral perspective, maternal nutrition knowledge enhances a mother's capacity to make informed decisions regarding food selection, meal preparation, and feeding frequency, which are critical determinants of child growth during the first 1,000 days of life. These results support the

working hypothesis that maternal nutrition knowledge functions as a proximal determinant of child nutritional status.

However, the review also reveals that the strength of this relationship is context-dependent. Several studies reported non-significant associations between maternal nutrition knowledge and child anthropometric outcomes in settings characterized by poverty, food insecurity, and limited access to health services. This finding aligns with earlier research suggesting that knowledge alone may not translate into improved nutritional outcomes when structural constraints restrict the availability and affordability of nutritious foods (Masilela & Modjadji, 2023). In such environments, maternal nutrition knowledge appears to be a necessary but insufficient condition for improving child nutritional status, highlighting the importance of addressing broader socioeconomic determinants.

Maternal education emerged as a strong and consistent predictor of child nutritional outcomes across most reviewed studies. Higher maternal educational attainment was associated with better child growth indicators, including improved linear growth and lower prevalence of stunting and underweight. These findings are consistent with human capital theory, which posits that education enhances cognitive skills, health literacy, and access to information, thereby improving health-related behaviors and outcomes. Educated mothers are more likely to utilize maternal and child health services, practice appropriate hygiene, and engage in preventive health behaviors, all of which indirectly support optimal child nutrition.

Nevertheless, several studies included in this review indicated that the direct effect of maternal education diminished after controlling for maternal nutrition knowledge and household wealth. This suggests that maternal education may exert its influence primarily through intermediary mechanisms, particularly nutrition knowledge acquisition and caregiving capacity, rather than through a direct causal pathway. This finding supports previous evidence indicating that education enhances the ability to acquire and apply nutrition-related knowledge, which subsequently affects child feeding practices and nutritional outcomes.

The comparative analysis of maternal education and maternal nutrition knowledge further underscores their complementary roles. The review found that maternal nutrition knowledge partially mediates the relationship between maternal education and child nutritional status, suggesting that education serves as an enabling factor that facilitates the effective use of nutrition knowledge. Intervention-based studies reinforce this interpretation, demonstrating consistent improvements in maternal nutrition knowledge following education programs, although impacts on child anthropometric outcomes remain mixed. These mixed results highlight the influence of contextual factors such as household food security, maternal workload, and access to diverse foods, which may moderate the effectiveness of nutrition education interventions.

Overall, the findings of this review contribute to the broader literature by emphasizing that strategies to improve child nutritional status should not focus exclusively on either maternal education or nutrition knowledge in isolation. Instead, integrated approaches that combine nutrition education with poverty reduction, food security interventions, and strengthened health systems are more likely to yield sustainable improvements in child growth and development. Future research should prioritize longitudinal and intervention-based studies that examine how maternal nutrition knowledge interacts with socioeconomic and environmental factors over time. Additionally,

standardized measurement tools for assessing maternal nutrition knowledge would enhance comparability across studies and strengthen the evidence base.

CONCLUSIONS

This systematic literature review provides comprehensive evidence that maternal nutrition knowledge and maternal education are key determinants of child nutritional status. In line with the expectations outlined in the Introduction, the findings demonstrate that maternal nutrition knowledge is directly associated with improved child growth outcomes, while maternal education contributes indirectly by enhancing health literacy, access to information, and caregiving capacity.

The review further highlights that the effectiveness of maternal nutrition knowledge in improving child nutritional status is highly context-dependent. In resource-limited settings, structural constraints such as poverty and food insecurity may limit the translation of knowledge into practice. Consequently, maternal nutrition knowledge should be viewed as a necessary but not sufficient condition for improving child nutritional outcomes.

Based on the results and discussion, future efforts to address child malnutrition should adopt integrated and multisectoral approaches that combine maternal education, targeted nutrition education, and broader socioeconomic interventions. Further research is needed to explore causal pathways through longitudinal designs and to evaluate the long-term effectiveness of nutrition education programs when combined with food security and social protection initiatives.

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