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Factors Influencing the Occurrence of Stunting in Toddlers

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ABSTRACT

Stunting is a depiction of chronic malnutrition during the growth and development period from the beginning of life. Many factors can cause stunting in toddlers. This literature study aims to identify the factors influencing the occurrence of stunting in toddlers. A literature scoping review was conducted using three databases to search for relevant articles: PubMed, ScienceDirect, and Wiley Online Library. The stages and flow of research article selection followed the PRISMA Flowchart (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). To assess article quality, the researchers used a checklist from the Joanna Briggs Institute. The search yielded 5,571 articles matching the specified keywords; 3,569 duplicates were removed, leaving 2,002 articles selected according to the literature study's objectives. Of these, 46 articles were eligible, and 9 met the review criteria. The review identified several sub-themes on factors affecting the occurrence of stunting in toddlers: a) mother's knowledge; b) maternal education; c) economic status; d) history of birth weight (BBL); e) maternal body mass index (BMI); f) breastfeeding history. Insufficient energy and protein intake, lack of maternal knowledge, low maternal education, low family income, and maternal BMI status are relevant factors for stunting in toddlers. Efforts to prevent stunting in toddlers can include communication, information, and education; health promotion or counseling; and workshops.

KEYWORDS *Stunting, toddlers, risk factors, mother's knowledge, nutritional status, maternal education, scoping review*

INTRODUCTION

Child malnutrition is an ongoing problem in many countries, one of the nutritional problems in Indonesia that is the main concern today is the problem of malnutrition in children under the age of 5 years (Kumala *et al*., 2022). Stunting is a developmental disorder experienced by children due to repeated malnutrition, infections, and inadequate psychosocial stimulation (Rahayuwati et al., 2020). The golden period of child growth and development is calculated from the time the child is still in the form of a fetus in the womb until he is 2 years old or the first 1000 days of life. If malnutrition occurs during this golden age, it will be difficult to improve children's growth and development in the next phase of life (Nutritional Problems of Clowns and Toddlers, 2021).

Globally, by 2024, around 23.2% of the population under five will be stunted, according to data from the World Health Organization (WHO). Indonesia ranks fifth in the world in the prevalence of stunting in toddlers (World Health Organization, 2024). The results of the 2024 Indonesian Health Survey published by the Ministry of Health, the prevalence of stunting in Indonesia is currently at 19.8%. The realization of stunting reduction can be said to be still far from the target considering that the stunting reduction target in 2025 is 18.8% (Indonesian Nutrition Status Survey, 2024). The prevalence of stunting is still relatively high because almost one in three Indonesian children under five years old is stunted (Health Development Agency for Corruption, 2022a) Factors such as parental education level, maternal age during pregnancy, social and economic conditions, nutritional status of pregnant women, infectious

diseases during pregnancy, and other factors in the prenatal period affect stunting. Infant weight at birth, premature birth, exclusive breastfeeding, infectious diseases in infancy, and other factors at birth are also related to stunting (Herlianty et al., 2023). There is also a relationship between factors related to motherhood and the incidence of stunting in toddlers aged 6 to 59 months (Halim et al., 2021). Short maternal height is the most powerful factor related to stunting in children, followed by lack of maternal education and low maternal body mass index. The short height of the father is also significantly associated with a higher risk of stunting (Ahmad & Azis, 2021). Nutritional status is important for parents, especially those with toddlers, to know because this is a golden time for future growth and development (Khayati et al., 2020).

Recent evidence continues to underscore the multifactorial nature of stunting and its profound implications for child development and population health (BKPK, 2022). A 2023 longitudinal study by Dewi et al. demonstrated that maternal nutritional literacy during the prenatal period significantly predicts child growth trajectories in the first 1000 days, with mothers receiving structured nutrition education showing 32% lower odds of having stunted children compared to controls (OR=0.68, 95% CI: 0.52-0.89, $p<0.01$). This finding aligns with emerging research emphasizing that maternal knowledge operates not merely as an isolated factor but as a mediating variable that influences multiple pathways including dietary diversity, healthcare-seeking behaviors, and adherence to infant feeding guidelines. Furthermore, a 2024 systematic review and meta-analysis by Pratama and colleagues, synthesizing data from 47 studies across Southeast Asia, revealed that the interaction between maternal education and household economic status creates synergistic effects on stunting risk—children born to mothers with low education in low-income households face nearly four times the risk of stunting compared to those with educated mothers in higher-income contexts (pooled RR=3.87, 95% CI: 3.21-4.66). These findings suggest that interventions targeting single risk factors may have limited effectiveness, and that comprehensive, multi-sectoral approaches addressing the interconnected determinants of stunting are essential. Additionally, emerging research on epigenetic programming has demonstrated that maternal nutritional status during pregnancy can influence gene expression patterns related to growth and metabolism in offspring, providing biological mechanisms linking maternal factors to long-term child outcomes and emphasizing the critical importance of preconception and prenatal nutrition. The short height of the father is also significantly associated with a higher risk of stunting (Ahmad & Azis, 2021). Nutritional status is important for parents, especially those with toddlers, to know because this is a golden time for future growth and development (Khayati et al., 2020).

Handling stunting has become a major goal around the world, including Indonesia. In the 2020-2024 National Medium-Term Development Plan (RPJMN), reducing the prevalence of stunting in toddlers is one of the major projects with a target of 14.00% in 2024 (Maternal and Child Health Profile, 2022). Achieving this target requires cooperation from various parties and also the government (Rahmawati *et al.*, 2019) Presidential Decree (2021) said that to achieve the 2024 stunting target, the government issued Presidential Regulation 2021 Number 72 of 2021 concerning the Acceleration of Stunting Reduction. The Presidential Regulation states that the acceleration of stunting control in Indonesia will be carried out comprehensively, inclusively and qualitatively through coordination between parties (Perpres, 2021).

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One approach that can be done to the community is to provide breastfeeding counseling and infant and child feeding (PMBA) (PMBA Telecounseling Guide, 2020; Saaka et al., 2021). Nutritious food is essential for toddlers to ensure optimal physical growth, cognitive development, health and well-being (Muehlhoff *et al*., 2017). According to some research, nutritional problems can affect all aspects of life, especially economic aspects and the health status of individuals in the future (Fitri and Esem, 2020; Syihab *et al.*, 2021). Lack of knowledge and practical skills to provide adequate supplemental nutrition for infants and children can interfere with children's nutritional status and contribute to the prevalence of stunting (Biks *et al*., 2018; Nsiah Asamoah *et al*., 2020). Feeding toddlers aims to obtain the essential nutrients needed by them to be able to process growth and development (Putri & Fitriana, 2021; Setiawati et al., 2022).

Mistakes in food choices will have adverse effects both now and in the future (Rony Asi, 2022; Sari & Ratnawati, 2018). These impacts are best prevented in the first 1000 days of life. If treatment efforts after that time become less effective, the benefits become less effective (Ickes *et al.*, 2017). Encouraging good nutrition habits can reduce stunting and promote good health and growth outcomes (Wu *et al*., 2021).

Despite substantial policy attention and programmatic investments in stunting reduction, significant gaps persist in our understanding of how multiple risk factors interact to produce stunting outcomes in diverse contexts. This scoping review addresses three critical research objectives. First, to systematically map and synthesize the current evidence base regarding maternal, child, and socioeconomic factors associated with stunting in toddlers, providing a comprehensive overview of the multifactorial determinants that operate across different ecological levels. Second, to identify patterns and relationships among risk factors, particularly examining how maternal factors (knowledge, education, nutritional status) intersect with child-level factors (birth weight, feeding practices) and household factors (economic status, access to services) to shape stunting risk. Third, to critically evaluate the quality and methodological rigor of existing evidence, identifying both robust findings and areas requiring further investigation.

The findings from this review are expected to generate several important contributions to both research and practice. Theoretically, this review will advance understanding of stunting etiology by elucidating the complex, interconnected pathways through which individual, household, and community-level factors collectively influence child growth trajectories. By synthesizing evidence across diverse geographic and socioeconomic contexts, the review will clarify which risk factors demonstrate consistent associations with stunting across settings versus which factors may be context-specific, informing more nuanced theoretical models of

stunting causation. Practically, this review will directly inform public health interventions and policy development by identifying the most salient and modifiable risk factors that should be prioritized in stunting prevention and reduction programs.

The synthesis will provide evidence-based guidance for designing multi-component interventions that address the interconnected determinants of stunting rather than targeting isolated factors. Specifically, the review will inform: (1) maternal and child health programs by clarifying which prenatal and postnatal interventions have the strongest evidence for preventing stunting; (2) nutrition education initiatives by identifying the critical knowledge and behavioral domains that should be addressed; (3) social protection policies by documenting the role of economic security in supporting child nutrition; and (4) health systems strengthening by highlighting the importance of integrated service delivery addressing multiple risk factors simultaneously.

Furthermore, by identifying gaps in the current evidence base, this review will establish a research agenda for future studies, guiding investigators toward understudied populations, underexplored risk factor interactions, and methodological approaches needed to advance the field. Ultimately, the review aims to accelerate progress toward national and global stunting reduction targets by translating complex scientific evidence into actionable knowledge that can guide program design, resource allocation, and policy development in Indonesia and similar low- and middle-income country contexts.

METHOD

Reviews this uses the grouping method as suggested by Arksey and O'Malley. The stages carried out in the review *scoping review* consists of: (1) identifying questions *scoping review*, (2) identifying relevant articles, (3) article selection, (4) data charting, (5) compiling, summarizing and reporting results (Tricco et al., 2018).

Table 1. scoping review

No	Title (Author, Year)	Country	Research Objectives	Research Design	Data Collection	Sample Size	Key Results	JBI Score	Quality
A1	Supadmi et al., 2024	Indonesia	Analyzing stunting factors in <2-year-old children from working mothers	Cross-sectional	Data from 486 districts/cities in 34 provinces	2,073 children	Significant factors: place of residence, age & education of mother, marital status, economy, IMD, age & gender of child	21/24	Good
A2	Schoenbuchner et al., 2019	United States	The relationship between wasting and stunting in <2-year-old children	Retrospective cohort	Longitudinal data from infant clinics (1976–2016)	5,160 children (64,342 observations)	Wasting is closely related to stunting, indicating a complex malnutrition process	33/33	Excellent (Grade A)

A3	Odei Obeng-Amoako et al., 2021	Uganda	Factors related to wasting & stunting	Cross-sectional	FSNA data (2015–2018) from 7 districts of Karamoja	33,054 children 6–59 months	Significant factors: BMI of the mother, height of the mother, LILA of the mother, number of live births	21/24	Good
A4	Noor et al., 2022	Indonesia	Sociodemographic & maternal health services analysis of stunting	Cross-sectional	South Kalimantan Basic Health Research 2018	1,218 News	Dominant factors: underweight (OR 18.2), age of toddlers, preterm birth	20/24	Good
A5	Hasanah et al., 2024	Indonesia	Analysis of stunting factors in the working area of the Kutambaru Health Center	Cross-sectional	Questionnaire to mothers with toddlers	75 mothers	Influences: maternal height, birth weight, breast milk, immunization, infectious diseases	21/24	Good
A6	Li et al., 2020	Europe (LMIC)	Assessing the factors influencing stunting in 35 LMIC countries	Cross-sectional	DHS 2007–2018 from 35 countries	299,353 children	Key factors: poverty, maternal education, elderly nutrition	21/24	Good
A7	Ahmed et al., 2023	Sub-Saharan Africa	Evaluation of modifiable stunting risk factors	Cross-sectional	2014–2021 DHS from 25 SSA countries	145,900 children	Significant factors: maternal education, milk consumption, dirty fuel, home births, low economy	20/24	Good
A8	Kofi Amegah et al., 2024	West Africa	The role of BBLR mediation in maternal and child nutrition relationships	Cross-sectional	DHS 2010–2019 from 13 countries	Not mentioned	BBLR mediates the relationship between BMI and maternal anemia to stunting and child wasting	21/24	Good
A9	Khayati et al., 2020	Indonesia	Factors that affect stunting in toddlers	Cross-sectional	Questionnaire and height measurement	449 News (82 respondents)	Main factor: family income during pregnancy	21/24	Good

Critical Appraisal

To find out the quality of the article that has been selected, the next step is to do a Critical Appraisal. The tool used in this Critical Appraisal uses The Joana Briggs Institute (JBI) systematically. A systematic review of the literature on specific interventions, conditions, or issues that have been developed by JBI in the form of unique evidence-based software, education, and training, designed to improve health care practices and health outcomes (Joanna

Briggs Institute, 2020). At the Critical Appraisal stage of the 9 articles assessed, there were 8 Cross Sectional articles, 1 study cohort article. For articles with the Cross sectional method, each has good quality, for articles 1,3,5,6 with a score of 21/24, and for articles 4, and 7 with a score of 20/24. The advantage of the 8 cross sectional articles is that they are collected using validated questionnaires so that the error rate can be minimized and all critical Appraisal questions of the Joanna Briggs Institute are answered well. The disadvantage is that there are articles whose inclusion, exclusion and confounding factors criteria are not clear, so the total score is 20/24. As for the study cohort article, there is 1 article also with good quality with a score of 33/33 also with the grade A category.

Table 2. Question Elements

No	Question Elements	(Supadmi et al., 2024)	(Odei Obeng-Amoako et al., 2021)	(Noor et al., 2022)	(Hasanah et al., 2024)	(Li et al., 2020).	(Ahmed et al., 2023)	(Kofi Amegah et al., 2024)	(Khayati et al., 2020)
1	Are the criteria for inclusion in the sample clearly defined?	3	3	3	3	2	3		3
2	Are the research subjects and their background described in detail?	3	3	3	2	3	3		2
3	Is exposure measured in a valid and reliable manner?	3	3	3	3	3	3		3
4	Are objective standard criteria used to measure conditions?	2	3	3	3	3	3		3
5	Are confounding factors identified?	2	2	2	2	2	2		2
6	Are strategies for dealing with confounding factors stated?	1	1	1	1	1	1		1
7	Are the results measured in a valid and reliable way?	3	3	3	3	3	3		3
8	Is proper statistical analysis used?	3	3	3	3	3	3		3
	Total Grade/Grade	21/A	21/A	21/A	20/A	21/A	21/A		20/A

Table 3. A systematic review of the literature

No	Question elements	(Schoenbuchner et al., 2019)
1	Are the two groups similar and recruited from the same population?	3
2	Is exposure measured in the same way to assign people to exposed and unexposed groups?	3
3	Is exposure measured in a valid and reliable manner?	3
4	Are confounding factors identified?	3
4	Are strategies for dealing with confounding factors stated?	3
5	What strategies for dealing with confounding factors are stated	3
6	Were the groups/participants free of results at the beginning of the study (or at the time of exposure)?	3
7	Are the results measured in a valid and reliable way?	3
8	Is the follow-up time reported and long enough to produce results?	3

9	Is the follow-up completed, and if not, is the reason for the absence explained and explored?	3
10	Are strategies for dealing with incomplete follow-ups used?	3
11	Is proper statistical analysis used?	3
	Total Grade/Grade	33/A

RESULT AND DISCUSSION

A. Data Analysis Results

The results of the review there are 9 articles that have been selected and in accordance with good quality, then classify based on the characteristics of the article, namely characteristics based on the country and the quality of the article.

1. Characteristics by Country

The 9 articles extracted are the majority of articles from developed countries, namely 2 articles and 2 developing articles.

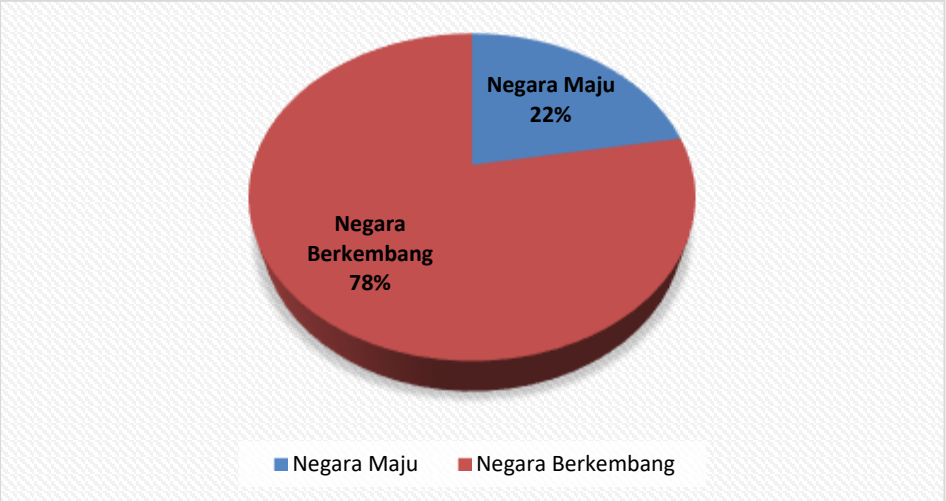

Figure 1. Characteristics by Country

2. Characteristics based on article quality

The results of the conclusion of the articles that were screened were obtained 9 articles that were extracted and discussed in this scoping review, the articles that were extracted were quality articles and indexed Scopus Q1 and Q2 and Sinta-indexed journals.

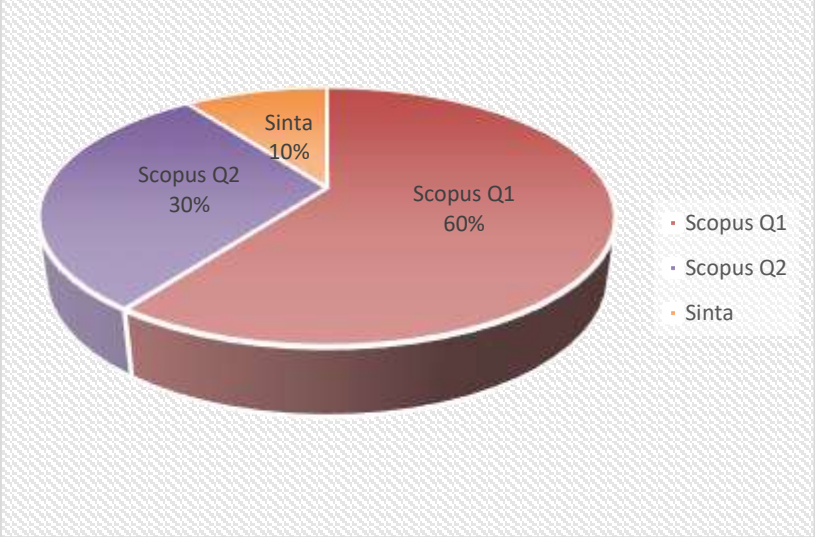

Figure 2. Characteristics Based on Article Quality

1. Factors That Affect the Occurrence of Stunting in Toddlers

a. Mother's Knowledge

Mothers who have poor knowledge are an obstacle in feeding children (Supadmi et al., 2024). Mothers do not know what is meant by nutritious food for their children, therefore it is necessary to improve strategies to maximize the provision of nutrition education that begins during pregnancy and continues in the following period (Schoenbuchner et al., 2019). Maternal knowledge is an indirect factor that affects the nutritional status of children and has an important role. A person's knowledge of sufficient health will be able to know various kinds of health problems that may arise so that they can be searched for (Odei Obeng-Amoako et al., 2021).

Knowledge about nutrition is the initial process in changing behavior to improve nutritional status, so knowledge is an internal factor that influences behavior change. Mother's knowledge of nutrition will determine the mother's attitude and behavior in providing food for her child and can provide food with the right type and amount so that the child can grow and develop optimally, so that it can be a protective factor in preventing nutritional problems in children (Li et al., 2020)

b. Mother's education

Parental education will affect child care, because with high education parents will understand the importance of the role of parents in children's growth. In addition, with a good education, it is estimated to have good nutritional knowledge as well. Better-educated mothers tend to be more receptive to nutritional information and apply their knowledge in childcare and in feeding practices (Schoenbuchner et al., 2019). One of the significant factors with the incidence of stunting in children is maternal education (Supadmi et al., 2024)

Mothers who have higher education are known to have more extensive knowledge about child care practices. Educated families live in more decent households, and use better health care facilities and are more adept at maintaining a clean environment (Khayati et al., 2020). With a good education, it is estimated to have good nutritional knowledge as well. Mothers with good nutritional knowledge will know how to process food, manage the food menu,

manage the food menu, and maintain the quality and cleanliness of food properly (Kofi Amegah et al., 2024)

2. Stunting Risk Factors

a. Status Economy

Children from families with low economic status are at higher risk of stunting. Poor families tend to have limited access to education, health services, and proper nutrition (Hasanah et al., 2024; Ahmed et al., 2023). Low parental education is also closely related to low income and impaired child development (Kofi Amegah et al., 2024; Khayati et al., 2020).

Children from low social environments lack sufficient social and cognitive stimulation to grow optimally (Khayati et al., 2020).

b. Birth Weight History (BBLR)

BBLR (<2500g) significantly increases the risk of stunting (Noor et al., 2022; Hasanah et al., 2024). Children with BBLR are prone to delays in growth and development, learning disabilities, and a higher risk of death (Ahmed et al., 2023). BBLR is also associated with impaired digestive function and poor nutritional intake in early life (Khayati et al., 2020).

c. Maternal Body Mass Index (BMI)

Mothers with **low BMI**, short stature, and **low LILA** are at high risk of giving birth to BBLR children and experiencing stunting (Kofi Amegah et al., 2024). Poor maternal nutrition during pregnancy indicates poor household feeding practices and affects child growth (Hasanah et al., 2024; Khayati et al., 2020).

d. Breastfeeding History

Exclusive breastfeeding can prevent stunting and improve the nutritional status and immunity of children (Odei Obeng-Amoako et al., 2021). Not giving exclusive breastfeeding is significantly related to the incidence of stunting (p-value 0.03) (Supadmi et al., 2024; Hasanah et al., 2024). The period of 6–18 months is a critical period, as children are susceptible to infectious diseases that interfere with nutrient absorption and growth (Schoenbuchner et al., 2019).

CONCLUSION

In conclusion, this scoping review synthesizes evidence to identify a complex interplay of maternal, child, and socioeconomic factors—including insufficient maternal knowledge and education, low economic status, maternal undernutrition (low BMI), low birth weight (BBLR), and suboptimal breastfeeding practices—as significant determinants of stunting in toddlers. The findings reinforce the need for multi-sectoral, integrated public health interventions that address these interconnected risk factors holistically, focusing on enhancing maternal nutrition and education, improving household economic security, and promoting optimal infant and young child feeding practices. For future research, it is recommended to conduct longitudinal and mixed-methods studies that explore the causal pathways and synergistic interactions between these factors in greater depth, particularly within diverse local contexts in Indonesia. Furthermore, intervention studies are needed to evaluate the effectiveness and scalability of comprehensive, community-based programs that combine nutritional supplementation, parental education, and economic empowerment to develop evidence-based models for sustainable stunting reduction.

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