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Determinants Of Stunting Among Toddlers: A Systematic Literature Review

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Abstract

Stunting remains a significant public health challenge in Indonesia, with a prevalence of 24.4%, according to the 2021 Indonesia Nutrition Status Survey (SSGI). This high rate indicates the country's ongoing struggle to meet its 2024 target of reducing the stunting rate to 14%. Stunting, characterized by impaired growth and development due to chronic malnutrition, is influenced by various socioeconomic, environmental, and biological factors. Understanding these factors is essential for developing effective intervention strategies. This systematic literature review synthesizes current evidence on the determinants of stunting among toddlers in Indonesia, providing insights that can guide public health policies and programs. Using the PRISMA methodology, we comprehensively searched peer-reviewed articles published between 2018 and 2022 from databases such as Google Scholar and PubMed. The studies indicate that stunting is influenced by a complex interaction of factors, including maternal education, household income, sanitation practices, healthcare access, and the child's age, gender, and health status. Notably, maternal education and household socioeconomic status emerge as critical determinants. The findings emphasize the need for multi-sectoral, community-based interventions that integrate these determinants. In conclusion, addressing these factors through integrated, community-based strategies is crucial for reducing stunting rates and improving child health outcomes in Indonesia.

Keywords: Stunting, Toddlers, Determinants, Public Health, Nutrition.

INTRODUCTION

Stunting in children is characterized by being underweight and having poor nutrition, as indicated by their height being below that of other children of the same age (1). Stunted children often struggle to reach their full physical and mental developmental potential; they may speak and walk slowly and frequently experience discomfort. Early-life stunting profoundly impacts cognitive development, affecting a child's physical and cognitive growth. This, in turn, influences their IQ and increases their vulnerability to non-communicable diseases in adulthood. Consequently, individuals who experience stunting may become less productive as adults (2,3).

In Indonesia, stunting is a pressing concern that demands urgent attention from the government. Presidential Regulation 72 of 2021 outlines a comprehensive strategy to combat stunting, which includes meeting the nutritional needs of mothers and infants during the critical first 1,000 days of life, ensuring access to clean water and proper sanitation, and promoting hygiene practices (4). Despite these efforts, the 2021 Indonesia Nutrition Status Survey (SSGI) reports a high stunting prevalence rate of 24.4 percent. With only two years left to achieve the target of reducing this rate by 10.4% by 2024, concerted efforts are required to address this issue effectively (5).

Maternal health and nutrition before, during, and after childbirth significantly influence stunting risk and fetal growth. Factors such as the mother's body posture (short stature) and the intervals between pregnancies also play a role. According to the Health Services Regulation of the Minister of Health Number 97 of 2014, the conditions prior to conception, during pregnancy, and postpartum are crucial. Poor health of pregnant women, frequent pregnancies, early childbirth, and inadequate access to contraception and sexual health services exacerbate these issues (6).

A comprehensive public health nutrition analysis and methodology are essential to develop evidence-based and preven-

tion-focused interventions. Engaging all stakeholders in the program and empowering the community are critical steps. Understanding the causes of toddler stunting is crucial. Despite numerous publications addressing these issues, there needs to be more systematic literature reviews that synthesize existing studies to gain a deeper understanding of the factors contributing to stunting in children under five. A systematic literature review is vital as it provides a structured and transparent approach to synthesizing available evidence, enabling the identification of critical determinants and gaps in the literature that need to be addressed for more effective interventions. This study aims to identify variables associated with stunting prevalence, providing valuable insights into the causes of stunting in young children and benefiting the general public.

METHODS

This systematic literature review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We extensively searched peer-reviewed publications across Google Scholar and PubMed databases, focusing on studies published between 2018 and 2022. The search strategy employed a combination of keywords including: (Child OR Under-Five OR Preschool OR Paediatric OR Infant OR Baby); (Risk Factor OR Determinant OR Correlate OR Cause); and (Chronic Malnutrition OR Malnourish OR Undernourish OR Stunt), along with terms related to model analysis.

The search process involved retrieving articles from each database and importing them into Mendeley Library for organization and management. To ensure comprehensive coverage, we also examined the bibliographic references of all retrieved articles that met the inclusion criteria and used Google Scholar's citation tracking feature to identify additional relevant studies that might have been overlooked initially.

Studies were included in the review if they met the following criteria: (a) focused on children under five years of age; (b) investigated factors associated with child malnutrition, specifically stunting; (c) were published between 2018 and 2022; (d) employed multivariate regression or multilevel analysis models; and (e) were published in peer-reviewed journals.

Duplicate articles were carefully identified and removed. The initial screening of titles and abstracts was performed by the lead author (MT). In the subsequent full-text review phase, MT meticulously evaluated the remaining articles based on the inclusion and exclusion criteria. Data extraction and study assessments were conducted independently by both MT and RA. Any discrepancies in the evaluations were resolved through discussion and consensus. For each selected study, details such as the author, publication year, country of study, sample size, children's age, quality assessment score, and identified determinants of stunting were systematically recorded.

RESULTS

The PRISMA flow diagram outlines the process of searching for and screening articles that will be included in the literature review for this journal (chart 1).

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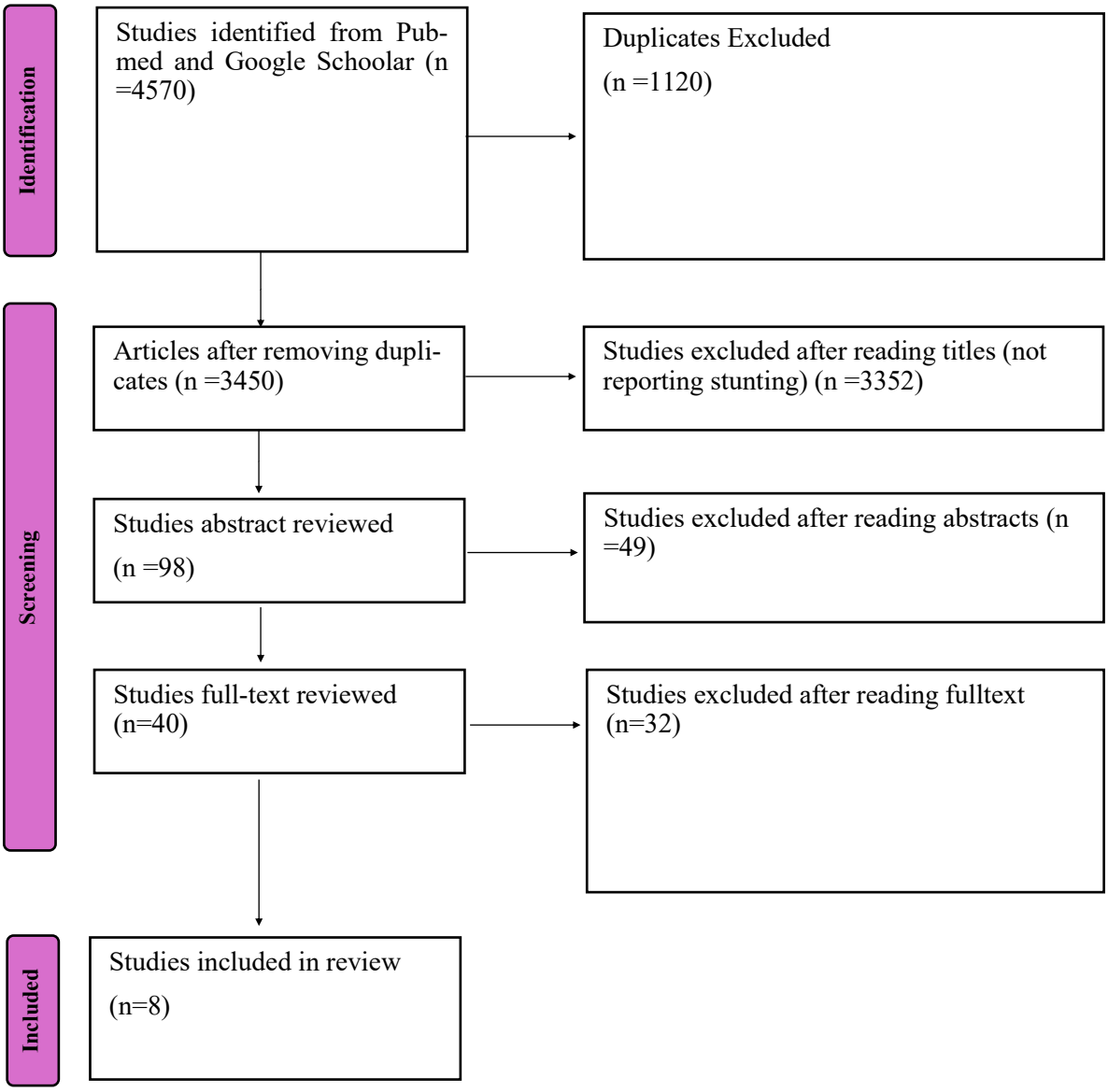

Chart 1. The PRISMA diagram

Our search yielded 4,570 articles from the two databases. After removing duplicates, 3,450 articles remained. Title screening excluded 3,352 articles, and abstract screening removed an additional 49. Following a full-text review, eight articles were selected for inclusion (Chart 1). These studies included research from Asia (4), Africa (2), and America (2), with sample sizes ranging from 115 to 48,656 participants.

The analysis revealed several consistent determinants of stunting among toddlers. Multiple studies have found that low maternal education is a recurrent factor associated with stunting. This finding aligns with the broader literature, which suggests that maternal education directly influences a child's nutritional status by affecting feeding practices, healthcare utilization, and overall caregiving quality. Children of mothers with limited education often have poorer access to health information and services, which can lead to suboptimal nutritional outcomes.

Table 1. Summary of certain studies' findings regarding the causes of stunting

Analysis model	Author, year, country	Sample	Result (stunting determinants)
Multivariate Logistic Regression	Martínez et al., 2018, Argentina(7)	48,656 live infants	Age, maternal education, BMI, parity, diabetes, hypertension, preeclampsia, tuberculosis, gestational age, congenital defects.
Multilevel Analysis (Sequential)	Titaley et al., 2019, Indonesia(8)	24,657 children aged 0-24 months	Families with ≥3 children under five, large household size (5-7 members), <4 antenatal care visits, male gender, age 12-23 months, low birth weight.
Multilevel logistic regression	Fantay Gebru et al., 2019, Ethiopia(9)	8,855 children under five; 640 community groups	Male gender, age >12 months, small size at birth, low socioeconomic status, uneducated mother, multiple births.
Multivariate Logistic Regression	Kragel, E.A., 2020, Guatemala(10)	31 women (interviews); 84 children (height and age measurements)	Inadequate prenatal care, improper nutrition, increased risk of infectious diseases, prevalent self-reported sickness, inadequate breastfeeding.
Case-control	Alifariki, L., 2020, Indonesia (11)	108 total (72 cases, 36 controls)	Mothers <150 cm height have a 2.6 times higher risk of stunted children compared to mothers >150 cm.
Cross-sectional	Fatima, S., 2020, Pakistan(12)	200 children less than five years	Joint family system, history of bottle feeding, unvaccinated status, and low literacy among moms
Case-control	Wicaksono, R., 2021, Indonesia(13)	194 children (97 cases, 97 controls) aged 1-60 months	History of chronic diarrhea, non-exclusive breastfeeding.
Bivariate and multivariate logistic regression	Yazew, T., 2022, Ethiopia(14)	500 children aged 6–59 months	Low socioeconomic status, inadequate diets, frequent child meals, leftover feeding practices.

DISCUSSION

Our findings align with existing literature, emphasizing the importance of maternal education, household socioeconomic status, and access to sanitation and healthcare. Maternal knowledge and attitudes regarding the first 1,000 days of life were notably significant in stunting prevalence, highlighting the need for maternal health educational interventions (15,16).

Stunting prevalence was also associated with age, particularly in the 12-23 months, 36-47 months, and 48-59 months age groups, while it decreased in the 0-11 months group. This trend is consistent with other studies, indicating that children become more vulnerable to growth faltering as they age, especially during critical periods of dietary transition and increased exposure to environmental factors.

Gender differences were evident, with stunting more common in boys than in

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girls. This could be due to biological differences, where boys may be more sensitive to nutritional deficits during early childhood. Additionally, the socioeconomic status of the household emerged as a significant determinant. Households with limited resources often experience food and nutritional insecurity, which directly impacts children's growth and development. The poorest households are also more likely to have lower education levels, inadequate knowledge about nutrition and health, and limited access to healthcare services, exacerbating the risk of stunting (17,18).

Low birth weight (below 2.5 kg) was another critical determinant. Children born with low birth weights are at a higher risk of stunting, as maternal undernutrition during pregnancy often leads to poor fetal growth. This finding echoes existing evidence that low birth weight strongly predicts stunting, reflecting the cumulative effects of maternal health and nutritional status before and during pregnancy (19). Maternal undernutrition increases the risk of low birth weight, preterm birth, and small for gestational age (SGA), which increases the risk of undernutrition later in children. This is similar to the findings of our study. (20) In a similar vein, it has been demonstrated that teenage pregnancies are linked to low birth weight and early childhood stunting. (21) Environmental factors, such as lack of access to improved drinking water sources and poor sanitation, were also significant contributors to stunting. Children living in households with unimproved drinking water and sanitation facilities are more susceptible to waterborne diseases like diarrhea, which can impair nutrient absorption and lead to stunting. Moreover, episodes of diarrhea in the past three months were strongly associated with increased stunting risk. Finally, rural residence was identified as a critical determinant. Rural areas often have limited access to healthcare services, lower educational attainment, and poorer socioeconomic conditions, all of which contribute to higher stunting rates. The high prevalence of stunting in rural areas underscores the need for targeted interventions that address the unique challenges rural communities face (22).

Given the findings of this review, healthcare professionals play a crucial role in addressing the determinants of stunting. Strategies should include the promotion of maternal education on nutrition, especially targeting mothers with lower educational levels, and ensuring adequate prenatal care to minimize the risk of low birth weight and associated complications (23). Healthcare workers should also emphasize the importance of exclusive breastfeeding, proper weaning practices, and the need for vaccinations and good sanitation to reduce infection-related stunting. Finally, targeted interventions in rural areas, where stunting prevalence is higher, should be prioritized to bridge the gap in healthcare access and improve overall outcomes for children at risk of stunting.

CONCLUSIONS

This review underscores the complex interplay of factors contributing to stunting among children under five, with maternal education, socioeconomic status, and environmental conditions emerging as significant determinants. Consistently, low maternal education, poor socioeconomic conditions, inadequate prenatal care, and exposure to unsanitary environments are linked to higher stunting rates. Additionally, low birth weight, male gender, rural residence, and recurrent infections further heighten the risk.

Addressing stunting requires comprehensive strategies that prioritize maternal education, improve access to healthcare, and enhance living conditions, particularly in rural areas. Interventions should also promote proper prenatal care, exclusive breastfeeding, and clean water and sanitation access. Collaboration among healthcare professionals, policymakers, and community leaders is essential to effectively developing targeted programs that tackle these determinants and reduce stunting prevalence.

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