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Research article

Scoping Review: Determinants of Stunting in Children Under Five

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ABSTRACT

Background: Stunting in children under-five years old is a chronic nutritional problem caused by inadequate nutritional intake, maternal health, poor sanitation, and low socioeconomic conditions that have long-term impacts on children's growth and development. This study aimed to identify predictive factors for the incidence of stunting among children under five years old in Indonesia, drawing on prior studies.

Methods: This study used a scoping review approach. The PICO framework was used to search for articles and formulate research questions. The literature search was conducted using Google Scholar and the DOAJ. Data extraction for the seven eligible articles was conducted by seven individuals. Examining the article's abstract, research design, measurement techniques, data analysis, and title was the first step in the extraction phase. A tabular synthesis matrix was then constructed from the data summary to facilitate the analysis. Finally, we compared and contrasted each publication's methodology, study results, and empirical evidence from theoretical and conceptual perspectives. Of the seven articles considered for inclusion, seven reviewers extracted data.

Results: The results show that exclusive breastfeeding, drinking water quality, waste disposal, the availability of healthy toilet facilities, stunting, age, male gender, history of measles, family size, sanitation, father's occupation, provision of supplementary food, complementary feeding, maternal knowledge, and family support are significant determinants of the incidence of stunting.

Conclusion: One of the dominant factors influencing stunting in toddlers is exclusive breastfeeding.

I. Introduction

The presence of stunting and wasting in children younger than five years old are two of the most important indicators of malnutrition in children (Donkor et al., 2022). Children under the age of five who are stunted may experience delays in mental and physical development due to factors such as an unhealthy diet, low socioeconomic status, and unique maternal and child traits. Consequently, they struggle with physical and mental development, have poor intelligence, are more prone to illness, and exhibit a lack of inventiveness and originality (Sihotang et al., 2023). Consequently, the prevention of stunting ought to be carried out during the first one thousand days of a kid's life, which is to say, from the moment of conception until the child reaches the age of two (Novianti et al., 2023).

The severity and trends of child malnutrition are described by estimates of stunting, wasting, overweight, and underweight, which align with the Sustainable Development Goals (SDGs) (UNICEF, 2025b). Globally, among children younger than five years old in 2024, an estimated 150.2 million were considered to be stunted, 42.8 million were considered to be underweight, and 35.5 million were

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considered to be overweight (WHO, 2025). Stunting among children under five decreased from 37.6% to 19.8% between 2013 and 2024, wasting decreased from 12.1% to 7.4%, and overweight decreased from 11.8% to 3.4%. These decreases demonstrate Indonesia's consistent efforts to combat all forms of child malnutrition during this critical age period (UNICEF, 2025a).

Previous studies indicate that children whose mothers had poor levels of education (OR = 1.57, 95% CI: 1.18−2.08), children residing in rural regions (OR = 1.39, 95% CI: 1.01−1.91), and children whose ages ranged from 24 to 35 months were the primary factors found to induce stunting in this study. (Suratri et al., 2023). Other studies also indicate that premature birth, under-five age ($p < 0.001$, with an OR value for ages 24−35 months 9511), and underweight ($p < 0.001$) were the most significant characteristics associated with stunting (Noor et al., 2022). Furthermore, significant factors associated with stunting were age 6-9 years, being a girl, poverty, a large family, an illiterate mother, a jobless head of family, and skipping breakfast (Rahimi et al., 2024). Various studies on stunting have been conducted. However, to date, the problem of stunting in Indonesia remains unresolved. Therefore, preventive efforts across sectors are needed to improve the nutritional status of children under five. In line with this, this study aims to identify predictive factors for the incidence of stunting among children under five in Indonesia, drawing on prior studies.

METHODS

This study used a scoping review approach. The PICO framework was used to search for articles and formulate research questions. The literature search was conducted using Google Scholar and the DOAJ. The article search used the keywords: ("stunting" OR "child stunting") AND ("risk factors" OR determinants) AND ("under-five children" OR toddlers) AND (Indonesia). The inclusion criteria for this study were (1) journal articles published from 2021 to 2025, (2) English-language articles with open access, and (3) articles published between SINTA 1 and SINTA 4. The exclusion criteria were (1) journal articles in the form of reviews, (2) articles published before 2021.

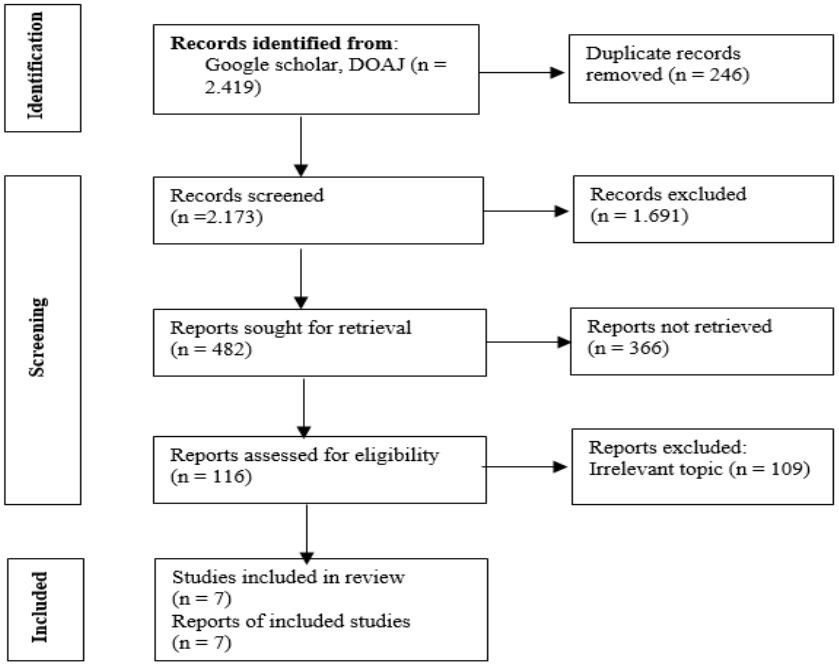

Figure 1. PRISMA

The article selection process begins by identifying publications from the Google Scholar and DOAJ databases. Data extraction for the seven eligible articles was conducted by seven individuals. Examining the article's abstract, research design, measurement techniques, data analysis, and title was the first step in the extraction phase. The first phase of the analysis was to summarise the articles. As part of this procedure, we reviewed the article's publication details, including the author, year, volume, and journal, as well as its methodology, key results, and data source.

A tabular synthesis matrix was then constructed from the data summary to facilitate the analysis. Article titles, abstracts, research designs, sample sizes, and data synthesis procedures were the first criteria used to sort the articles in the extraction step. Of the seven articles considered for inclusion, seven reviewers extracted data. Finally, we compared and contrasted each publication's methodology, study results, and empirical evidence from theoretical and conceptual perspectives

RESULTS

Data extraction results include participant names and years, participant counts, study design, data sources, and databases. The extracted data for this study are presented in Table 1.

Table 1. Extracted Data

Author and Year	Participant	Study Design	Data Source	Databases
(Lubis et al., 2023)	386	Cross-sectional	Secondary: E-PPGBM and PIS-PK data for 2020	AcTion: Aceh Nutrition Journal
(Kurniawati et al., 2025)	79	Cross-sectional	Primary data	Public Health of Indonesia
(Fitri et al., 2024)	4.554	Cross-sectional	Secondary data: Indonesian Nutrition Status Study (SSGI) 2021	AcTion: Aceh Nutrition Journal
(Sunarto et al., 2025)	120	Case-Control	Primary data	AcTion: Aceh Nutrition Journal
(Saadah et al., 2022)	150	Cross-sectional	Primary data	Jurnal Berkala Epidemiologi
(Pradnyawati et al., 2021)	56	Case-Control	Primary and secondary data	Jurnal Berkala Epidemiologi
(Purba et al., 2024)	63	Cross-sectional	Primary data	Jurnal Prima Medical Sains

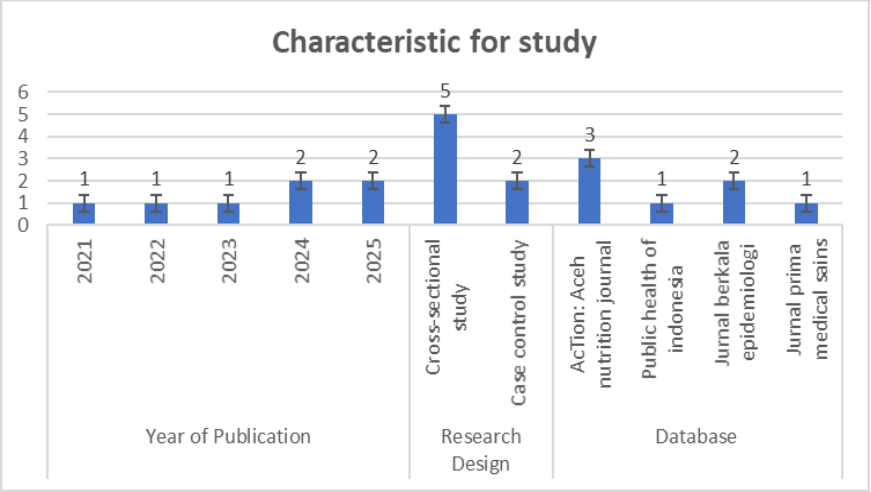

Figure 1. Characteristic for study

The predictor variables in this study varied widely. These included exclusive breastfeeding, delivery in a health facility, child growth and development monitoring, use of health insurance and healthy latrines, drinking water quality, household waste and garbage disposal facilities, weight and length, parental occupation and education, number of family members and history of measles, supplementary feeding and protein intake, history of infectious diseases and environmental sanitation, low birth weight and maternal nutritional status, income, home environment and family support. The predictor variables and findings for each study are presented in full in Table 2.

Table 2. Predictor Variables and Main Findings

Name and Year	Predictor Variables Studied	Key Findings
(Lubis et al., 2023)	Use of contraception, delivery in health facilities, immunisation, exclusive breastfeeding, growth and development monitoring, hypertension, smoking, health insurance, use of clean water, and use of toilets.	Exclusive breastfeeding was the dominant determinant. Toddlers who were not exclusively breastfed had a 2.93 times higher risk of stunting. Toilet use and smoking were also significantly associated.
(Kurniawati et al., 2025)	Drinking water quality, healthy toilet facilities, garbage disposal facilities, and household wastewater disposal facilities.	There is a significant association between drinking water quality, waste disposal, and the availability of healthy toilet facilities and stunting. Healthy toilet facilities are the most influential variable (OR = 6.8).
(Fitri et al., 2024)	Child's age, gender, weight, length, number of family members, father's and mother's occupation, father's and mother's education, sanitation, and history of measles.	Associated risk factors include age, male gender, history of measles, family size, sanitation, and father's occupation. The most dominant factor is being underweight, with a 9.3-fold higher risk (OR = 9.3).
(Sunarto et al., 2025)	Supplementary Feeding, Early Initiation of Breastfeeding, exclusive breastfeeding, income, birth length category, protein intake, father's education & height, mother's height.	Providing supplementary food significantly reduces the risk of stunting (aOR = 0.33).
(Pradnyawati et al., 2021)	Exclusive breastfeeding, complementary foods for breastfeeding (MP-ASI), nutritional status of pregnant women, low birth weight, infectious diseases, family income, and environmental sanitation.	The most significant risk factor for stunting was complementary feeding (OR = 4.63). Other factors, such as exclusive breastfeeding, low birth weight, and infectious diseases, were not significant in this study.
(Saadah et al., 2022)	Characteristics of the mother; mother's knowledge; child's physical health; nutritional status; home environment; outside-home environment; mother's commitment; family/husband support.	Maternal knowledge contributes to commitment to stunting prevention. Maternal commitment/role and family support are important factors that significantly influence stunting reduction.
(Purba et al., 2024)	Maternal height and exclusive breastfeeding practices.	Maternal height (p=0.026) and exclusive breastfeeding (p=0.003) significantly influenced the incidence of stunting. Children who were not exclusively breastfed had a 3.94 times greater risk of stunting (OR = 3.94).

DISCUSSION

Nutritional inadequacies, environmental sanitation, and parental variables are among the many factors that contribute to stunting in Indonesia, these factors change over time and across regions. According to the available data, areas like West Aceh and Gunungsitoli are particularly vulnerable to the negative effects of not providing exclusive breastfeeding to infants and young children (Lubis et al., 2023), (Purba et al., 2024). However, the inappropriate provision of supplementary meals (MP-ASI), as observed in Gianyar, becomes a concern as children mature (Pradnyawati et al., 2021), and the importance of Supplementary Feeding interventions, which have proven protective in Semarang (Sunarto et al., 2025), is underscored.

In addition to the people who come in, the physical environment is very important. This is especially true in areas with large populations, such as Bandung. In these places, not having clean latrines and bad sanitation are strong indicators of stunting because they cause people to get infections over and over again (Kurniawati et al., 2025), (Fitri et al., 2024). The aggregation of dietary deficiencies and

illnesses frequently results in underweight, recognized as the most significant risk factor for stunting (Fitri et al., 2024). Moreover, the structural and behavioural attributes of parents, such as maternal height (Purba et al., 2024), and paternal occupation (Fitri et al., 2024), alongside maternal commitment and knowledge bolstered by familial support (Saadah et al., 2022), constitute an essential caregiving ecosystem. This underscores that interventions to address stunting must be multifaceted and tailored to local needs, encompassing improvements in nutrition, sanitation infrastructure, and parenting practices.

Previous studies show that stunting was more common among female infants (POR1.05, 1.03-1.08), children born with low birth weight (POR 2.39, 2.07-2.76), and those who did not participate in the deworming program (1.10, 1.07-1.12). Consistently related with stunting were maternal factors such as maternal age > 30 years (POR 2.33, 2.23-2.44), preterm birth (POR 2.12, 2.15-2.19), and antenatal care <4 times (POR 1.25, 1.11-1.41) (Gusnedi et al., 2023). In addition, the mother's age at first pregnancy, parity, the heights and ages of the parents, and gestational age were all linked to stunting at birth. Children born to mothers who were short (height <145.0 cm) and fathers who were short (height <161.9 cm) were nearly six times more likely to be stunted (adjusted odds ratio, 5.93; 95% CI, 5.53 to 6.36). Stunting was less likely in mothers who were older at the time of their first pregnancy (Sari & Sartika, 2021).

In Indonesia and other low- and middle-income nations, stunting is a serious public health concern. Significant household-level variables linked to an increased risk of stunting include parental education and household wealth status. Children in areas lacking proper water, sanitation, and hygiene facilities are more likely to experience stunting (Mulyaningsih et al., 2021). Other studies show that a mother's education level, weight, height, body mass index (BMI), the child's age, and birth weight are determinants of the likelihood of stunting among children under five in South Sulawesi Province. At the same time, in West Sulawesi, factors such as maternal income, education level, weight, body mass index (BMI), child age, gender, and history of acute respiratory infection were identified as drivers of stunting among children younger than five years (Anastasia et al., 2023).

CONCLUSION

Exclusive breastfeeding, drinking water quality, waste disposal, the availability of healthy toilet facilities, stunting, age, male gender, history of measles, family size, sanitation, father's occupation, provision of supplementary food, complementary feeding, maternal knowledge, and family support are significant determinants of the incidence of stunting. Thus, qualitative research should be conducted to examine in greater depth the factors that affect stunting among children under 5 years old.

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CONFLICTS OF INTEREST

No conflicts of interest were disclosed by the writers of this work

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