



IS MOTHER'S EDUCATION IMPORTANT FOR PREVENTING *STUNTING*?: *A SYSTEMATIC REVIEW*

Sri Rahmi Putri Mawardi*, Azrimaidaliza, Idral Purnakarya

Faculty of Public Health, Universitas Andalas, Jl. Universitas Andalas, Limau Manis, Pauh, Padang, Sumatera Barat 25163, Indonesia

*srirahmiputrim@gmail.com

ABSTRACT

Indonesia is a disaster-prone country located on the Ring of Fire and frequently experiences hydrometeorological disasters, including landslides. Landslides not only cause physical and economic losses but also lead to psychological impacts, particularly anxiety, which is most often experienced by vulnerable groups such as women of childbearing age (WUS). Anxiety after disasters, if left untreated, can disrupt daily functioning and reduce quality of life. Cognitive Behavioral Therapy (CBT) has been recognized as an effective intervention to reduce anxiety and improve psychological resilience. This study aimed to analyze the level of anxiety in women of childbearing age after a landslide disaster and to evaluate the effectiveness of Cognitive Behavioral Therapy (CBT) in reducing anxiety. This quantitative study used an experimental pretest-posttest control group design. The population consisted of 40 women. The sample is a part of the accessible population that will be used as the subject of research using sampling techniques. The research sample is 20 people in the experimental group and 20 people in the control group. Childbearing age in the Lae Parira Health Center area, Dairi Regency, from April to October 2025. Samples were divided into two groups: 20 respondents in the experimental group receiving CBT and 20 respondents in the control group. Data were collected through interviews, observations, and standardized anxiety assessment. analysis using univariate analysis and bivariate analysis. The CBT group showed a significant decrease in anxiety scores from a median of 16 to 7 ($Z = -4.76$; $p < 0.001$; $r = 1.07$), while the control group experienced only a slight reduction from 17 to 15 ($Z = -3.49$; $p < 0.001$; $r = 0.78$). Between-group comparison confirmed that CBT was significantly more effective ($Z = 5.41$; $p < 0.001$; $r = 0.86$). Cognitive Behavioral Therapy is highly effective in reducing anxiety among women of childbearing age after a landslide disaster. Its implementation in primary healthcare settings can support post-disaster psychological recovery and improve community resilience.

Keywords: maternal education; stunting; systematic review; stunting program

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INTRODUCTION

Stunting is a condition of growth failure in children under five years of age, caused by chronic malnutrition over a long period, characterized by a z-score less than -2 standard deviations. Stunting results from chronic nutritional deficiencies during the first 1,000 days of life (HPK). In addition to impairing linear growth, stunting can also affect intellectual and cognitive development and reduce productivity in later life (WHO, 2013). Globally, the prevalence of stunting among children under five in 2024 was 23.2%, with the highest rates found in West and Central Africa (32.5%), Eastern and Southern Africa (32.1%), and South Asia (32.3%). Meanwhile, Southeast Asia reported a prevalence of 27.8%. Indonesia ranked second among Southeast Asian countries, after Myanmar, with a stunting prevalence of 26.9%. Encouragingly, Indonesia has shown progress in reducing stunting. According to the Indonesian Nutritional Status Survey (SSGI) 2022, 21.6% of children under 5 years old were stunted. This figure decreased slightly to 21.5% in the 2023 Indonesian Health Survey (SKI) and further to 19.8% in the 2024 SSGI. Despite this improvement, the prevalence remains above the target set in the 2024 National Medium-Term Development Plan (RPJM), which aims to reduce stunting to 14% (RI, 2021).

The World Health Organization (WHO) identifies five significant stunting determinants: household and family factors, inadequate complementary feeding, suboptimal breastfeeding practices, infection, and social and community factors (WHO, 2013). Among household factors, maternal characteristics play a key role. These include poor maternal nutritional status before, during, and after pregnancy, short maternal stature, infectious diseases, adolescent pregnancy, maternal mental health problems, intrauterine growth restriction (IUGR), complications during delivery, preterm birth, short birth spacing, and hypertension (WHO, 2013).

Maternal education is one of the important risk factors associated with stunting (Li et al., 2024). According to Soofi (2023), children of mothers with no formal education are 2.57 times more likely to experience stunting compared to those whose mothers have low or medium levels of education (Sahiledengle et al., 2023). Similarly, Fufa (2021) reported that mothers without formal education have 2.58 times higher risk of having stunted children compared to mothers with formal education (Fufa & Laloto, 2021). A systematic review aims to comprehensively identify, synthesize, and interpret published research findings. Therefore, this study seeks to gather and analyze evidence from articles published in major databases (ScienceDirect, MDPI, and PubMed) regarding the association between maternal education and the risk of stunting. The findings of this study are expected to provide evidence-based input to the Indonesian government in formulating policies to prevent stunting.

METHOD

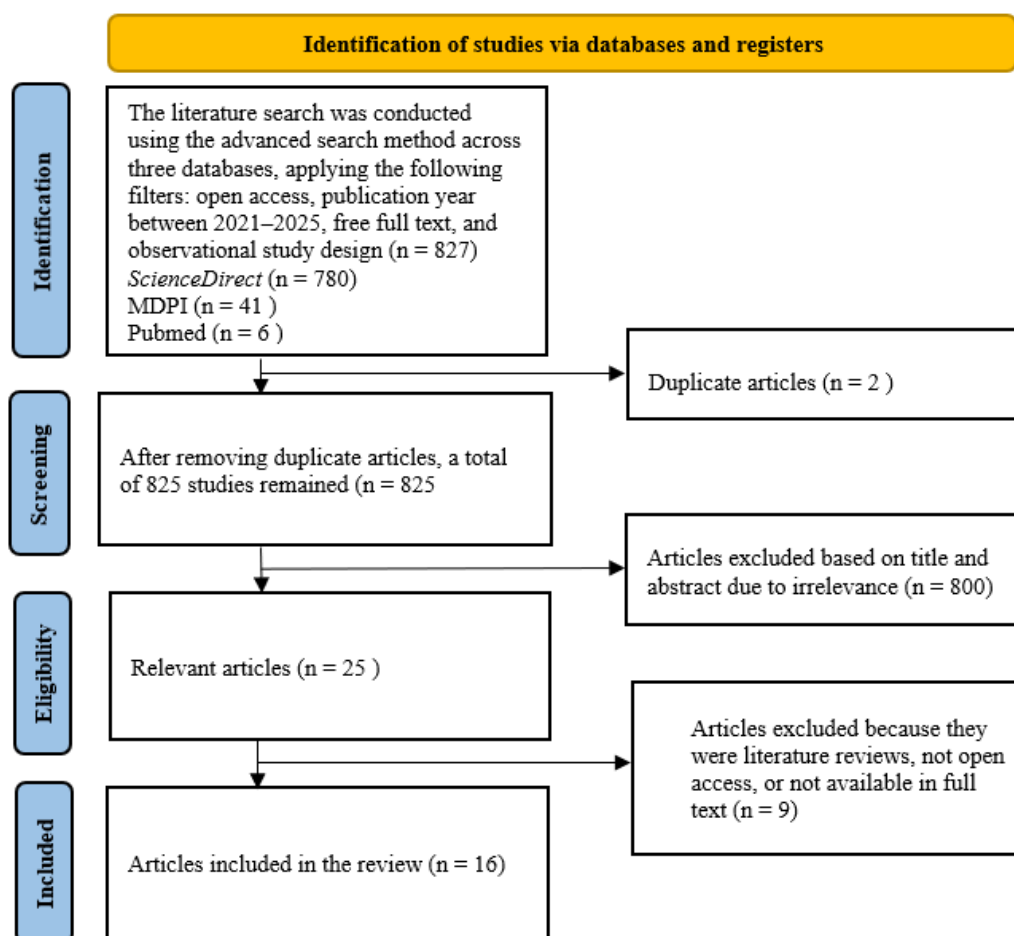


Figure 1. Flow Chart PRISMA Systematic Review

This study employed a systematic review method following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Figure 1). Article searches were

conducted using three databases: ScienceDirect, MDPI, and PubMed. The inclusion criteria for this review were articles published between 2021 and 2025. The exclusion criteria included duplicate articles, those without full text, articles with irrelevant titles or abstracts, and other systematic reviews. A total of 827 articles were identified from the three databases (ScienceDirect, MDPI, Pubmed) using the keywords 'mother education' and 'stunting'. After removing two duplicate articles and excluding 800 irrelevant articles based on their titles and abstracts, 25 articles were selected for full-text review. Following the screening process, 16 articles were reviewed (2 from ScienceDirect, 1 from MDPI, 13 from Pubmed).

RESULT

After completing all stages of the systematic review process, these 16 articles were included for further analysis and discussion in this study.

Table 1.
Summary Of the Articles that Have Been Analyzed

No	Author (s)	Title	Objective	Population	Study Design	Results
1	Sahiledengle et.al (2023)	Coexistence of Anaemia and <i>Stunting</i> among Children Aged 6–59 Months in Ethiopia: Findings from the Nationally Representative Cross-sectional Study	To identify the associated comorbid conditions in Ethiopia	21.172	Cross-sectional	Children born to mothers with no formal education (AOR: 3.66; 95% CI: 1.85–7.22) had a higher risk of child growth failure (CGF)
2	Soofi et.al(2023)	Determinants of <i>Stunting</i> among Children under Five in Pakistan	To determine the prevalence of <i>stunting</i> and its determinants among children under five years in Pakistan	52.602	Cross-sectional	Children whose mothers had no education (AOR: 1.57; 95% CI: 1.42–1.73; $p < 0.001$) or low education levels (primary: AOR = 1.35; 95% CI: 1.21–1.51; $p < 0.001$; secondary: AOR = 1.29; 95% CI: 1.15–1.45; $p < 0.001$) were more likely to experience <i>stunting</i>
3	Supadmi et.al(2024)	Factor related to the <i>stunting</i> of children under two years with working mothers in Indonesia	To examine the factors associated with <i>stunting</i> among children under two years of age whose mothers are employed in Indonesia	2.073	Cross-sectional	Children under 2 years old whose working mothers had no formal education (AOR: 1.282; 95% CI: 1.249–1.316; $p < 0.001$) had a higher risk of <i>stunting</i> than those whose mothers had higher levels of education.
4	Noor et.al(2022)	Analysis of Socioeconomic, Utilization of Maternal Health Services and Toddlers' Characteristics as <i>Stunting</i> Risk Factors	To analyze sociodemographic factors, maternal health care services, and child characteristics	1218	Cross-sectional	Children born to mothers who completed senior high school (AOR: 0.567; 95% CI: 0.410–0.748; $p < 0.001$) had a lower risk of <i>stunting</i> .
5	Sin et.al (2024)	Assessment of Childhood <i>Stunting</i> Prevalence over Time and Risk Factors of <i>Stunting</i> in the Healthy Village Programme Areas in Bangladesh	To assess the prevalence of <i>stunting</i> and identify contributing factors in program areas	132.038	Cross-sectional	Children whose mothers had low education or were illiterate had a higher risk of <i>stunting</i> (AOR: 1.25; 95% CI: 1.09–1.44) compared to those whose mothers were literate and highly educated.
6	Emigrabi et.al (2024)	Factors Associated with <i>Stunting</i> in Four African Countries: Evidence from Multiple	To identify the factors associated with <i>stunting</i> among children in four North African	39.983	Cross-sectional	Among children aged 24–59 months, those whose mothers had lower education had a higher risk of <i>stunting</i> (AOR: 1.46; 95% CI: 1.22–1.75); for

No	Author (s)	Title	Objective	Population	Study Design	Results
		Cluster Surveys, 2014–2019	countries			children aged 0–59 months, the risk remained elevated (AOR: 1.29; 95% CI: 1.11–1.48) compared to children of highly educated mothers
7	Fufa et.al (2021)	Factors associated with undernutrition among children aged between 6 and 36 months in Semien Bench district, Ethiopia	To determine the magnitude of stunting, and underweight, and the associated risk factors.	700	Cross-sectional	Children whose mothers had no formal education (non-formal education) (AOR: 2.58; 95% CI: 1.44–4.63) were more likely to experience stunting than those whose mothers had formal education.
8	Ayelign et.al (2021)	Household, dietary, and healthcare factors predicting childhood <i>stunting</i> in Ethiopia	To identify the factors associated with the risk of stunting among children under five years of age in Ethiopia	11.023	Cross-sectional	Higher maternal education levels were associated with a lower likelihood of child stunting (AOR: 0.67; 95% CI: 0.51–0.89) compared to mothers with no formal education.
9	Gbratto et.al (2025)(Gbratto-Dobe & Segnon, 2025)	Is mother's education essential to improving the nutritional status of children under five in Côte d'Ivoire?	To analyze the impact of maternal education on the nutritional status of children under five years in Côte d'Ivoire	8743	Cross-sectional	Mothers with secondary or higher education had a significantly lower risk of having stunted children (RRR: 0.434; 95% CI: 0.312–0.605; $p < 0.001$)
10	Nahalomo et.al (2022)	Malnutrition and Associated Risk Factors among Children 6–59 Months Old in the Landslide-Prone Bududa District, Eastern Uganda: A Cohort Study	To analyze the prevalence of malnutrition and its associated factors among children aged 6–59 months.	422	Cohort	Children of parents with lower levels of education were more likely to be stunted (AOR: 2.32; 95% CI: 1.17–4.60; $p < 0.042$) than those whose parents had higher levels of education.
11	Ahmed et.al (2021)	Predictive model of <i>stunting</i> in the Central Andean region of Peru based on socioeconomic and agri-food determinants	To develop a predictive model for stunting among children under five years in the Central Andean region of Peru using socioeconomic and agro-productive indicators	380	Cross-sectional	Mothers with secondary or higher education were twice as likely to have stunted children (OR: 0.518; 95% CI; $p < 0.01$)
12	Liu et.al (2021)	Prevalence of Malnutrition and Associated Factors of <i>Stunting</i> among 6–23-Month-Old Infants in Central Rural China in 2019	To evaluate the prevalence of malnutrition and identify stunting-related factors among children aged 6–23 months in rural China	17.193	Cross-sectional	Mothers with secondary or higher education had a lower risk of stunting in their children (AOR: 0.67; 95% CI: 0.51–0.88; $p < 0.001$) than those with lower education.
13	Suratri et al (2023)	Risk Factors for <i>Stunting</i> among Children under Five Years in The Province of East Nusa Tenggara (NTT), Indonesia	To identify the risk factors for stunting in East Nusa Tenggara	1643	Cross-sectional	Mothers with low education had a higher risk of having stunted children (OR: 1.57; 95% CI: 1.18–2.08) compared to mothers with higher education.

No	Author (s)	Title	Objective	Population	Study Design	Results
14	Li et al (2024)	Social determinants of child malnutrition outcomes: Evidence from CHNS in China	To identify the social determinants associated with stunting and wasting among children under five years of age	4.012	Cohort	Mothers with primary, secondary, or vocational education levels showed a significant association with stunting risk ($p < 0.01$), with higher maternal education associated with lower stunting risk
15	Kassai et.al (2025)	Socioeconomic Patterning of <i>Stunting</i> and Overweight Among Iranian Children Aged 2–5 Years: A National <i>Cross-sectional</i> Analysis	To examine the socioeconomic patterns of stunting and overweight among children aged two to five years in Iran	11.147	Cross-sectional	Illiterate mothers were twice as likely to have stunted children compared to literate mothers (95% CI: 1.30–3.30)
16	Wulandari et.al (2022)	The Targets for <i>Stunting</i> Prevention Policies in Papua, Indonesia: What Mothers' Characteristics Matter?	To analyze maternal characteristics that are essential for effective stunting prevention interventions	11.887	Cross-sectional	Mothers with primary school education or lower had a higher risk of stunting (AOR: 1.263; 95% CI: 1.228–1.300; $p < 0.001$) compared to mothers with secondary or higher education

DISCUSSION

Based on Table 1, 16 articles were reviewed, comprising 14 cross-sectional and 2 cohort studies. The review found that almost all studies demonstrated a significant association between maternal education and stunting incidence. These findings were consistent across various countries, including Indonesia, Ethiopia, China, Uganda, Iran, Bangladesh, and several regions in Africa. Children of mothers with no formal education were found to have a higher risk of stunting (Sahiledengle et al., 2023). According to Soofi (2023), children of uneducated mothers were 2.57 times more likely to experience stunting compared to those whose mothers had low or moderate levels of education (Soofi et al., 2023). Similarly, Fufa (2021) found that mothers without formal education had a 2.58 times higher risk of having stunted children compared to mothers with formal education (Fufa & Laloto, 2021). Consistent with these findings, Supadmi (2024) reported that children under two years old whose mothers lacked formal education and were employed had a higher risk of stunting compared to those whose mothers were both educated and employed (Supadmi et al., 2024).

In addition to uneducated mothers, low maternal education was also significantly associated with an increased risk of stunting. Several studies consistently reported that mothers with low educational attainment were more likely to have stunted children compared to those with higher education levels (Suratri et al., 2023). Furthermore, Sin et al. (2024) found that illiterate mothers had a 1.25 times higher risk of having stunted children than those who were literate and highly educated (Sin et al., 2024). Similarly, Nahalomo et al. (2022) reported that children aged 6–59 months from parents with low education levels had a 2.32 times higher risk of stunting compared to those from families with higher educational backgrounds (Nahalomo et al., 2022).

Children of mothers with secondary to higher education were at a lower risk of stunting compared to those whose mothers had low education levels (Gbratto-Dobe & Segnon, 2025). According to Ayelign et al. (2021), the higher the maternal education level, the lower the likelihood of stunting in children (Ayelign & Zerfu, 2021). Likewise, Ahmed et al. (2021) found that mothers with secondary or higher education were twice as likely to have stunted children (OR = 0.518, 95% CI, $p < 0.01$) compared to those with lower education. (Liu et al., 2021).

Stunting prevention can be achieved through various efforts. Several countries (Peru, Thailand, Vietnam, and Brazil) have successfully reduced stunting rates significantly (World Bank, 2019). In Peru, the key strategies included making the problem of stunting visible, focusing on evidence-based actions, providing incentives, and emphasizing measurable results. In Thailand, community-based integrated approaches were implemented with continuous technical support, resources, and strong political commitment. Meanwhile, in Brazil, the strategy focused on addressing the underlying causes of malnutrition, promoting equity-oriented policies, and improving access to education, healthcare, and sanitation. One notable program in Brazil involved improving women's education, which successfully reduced the prevalence of stunting among children under five from 37.1% to 7.1% (World Bank, 2019).

In Indonesia, stunting prevention programs adopt multi-sectoral and multi-stakeholder approaches, targeting both direct and indirect causes of stunting through comprehensive strategies that include nutrition-specific and nutrition-sensitive interventions. Education- and women-focused interventions include parenting and early childhood education programs, as well as child stimulation promotion led by the Ministry of Education and Culture and the Ministry of Women's Empowerment and Child Protection. However, there are currently no interventions specifically focused on improving women's formal education, which remains a crucial area for future policy development (Kementerian Sekretariat Negara, 2024).

Research Limitations

This study has several limitations. First, there was substantial heterogeneity among the included studies in terms of population size, study location, and the variables analyzed. Second, almost all of the reviewed articles employed a cross-sectional design, with only two studies using a cohort design, making it difficult to establish a clear cause-and-effect relationship between the analyzed variables.

CONCLUSION

Maternal education has been proven to be associated with the risk of stunting among children under five. The lower the mother's level of education, the higher the risk of stunting; conversely, higher maternal education is associated with a lower risk of stunting. Several countries have implemented both health and non-health sector programs to prevent stunting. In Brazil, initiatives to improve women's access to education have successfully reduced stunting prevalence, whereas such programs have not yet been implemented in Indonesia.

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