Journal of Epidemiology and Public Health (2025), 10(04): 513-524
Masters Program in Public Health, Universitas Sebelas Maret

Research

Open Access

Patient Safety and Hospital-Based Health Promotion in Preventing Infections and Their Impact on Childhood Stunting: A Systematic Review

Jasmin Ambas[1)], Yasinta Indah Widyaningsih[1)]

[1)]Department of Health Administration, Faculty of Sports Science and Health, Makassar State University, Indonesia

Received: 25 September 2025; Accepted: 10 October 2025; Available online: 16 October 2025

ABSTRACT

Background: Child stunting is influenced by nutrition, recurrent infections, and the quality of health services. Patient safety and hospital-based health promotion play key roles in preventing infections that increase stunting risk. This study aimed to analyze the role of patient safety and hospital-based health promotion in infection prevention and its impact on childhood stunting.
Subjects and Method: A systematic review was conducted following the PRISMA guidelines and the PICO framework. The Joanna Briggs Institute (JBI) Checklist was used for quality assessment. Articles were collected from Scopus, ScienceDirect, ProQuest, SpringerLink, Google Scholar, Nature, JSTOR, and Emerald Insight, covering publications from 2020 to 2025. The keywords used were: "patient safety" AND "hospital-based health promotion" AND "infection prevention" AND "childhood stunting", and "hospital governance" AND "infection control" AND "child growth". Boolean operators and Medical Subject Headings (MeSH) were applied to each database.
Results: This systematic review consisted of 10 articles that met the inclusion criteria. The studies, published between 2020 and 2025, originated from Indonesia, Ethiopia, Southeast Asia, and other developing regions. The findings showed that patient safety programs and infection control effectively reduced neonatal and childhood infections. Health promotion interventions, such as caregiver education and cadre training, improved hygiene and preventive behavior. Integration of hospital governance and policy strengthened infection prevention and service quality. Across the reviewed evidence, exposure to infection during the first 1,000 days of life was consistently linked to an increased risk of stunting (OR=1.85; 95% CI=1.42–2.37; p=0.001).
Conclusion: Patient safety and hospital-based health promotion are crucial for preventing infections and reducing stunting. Strengthening hospital governance through integrated infection prevention strategies is essential to accelerate stunting reduction.

Keywords: stunting, patient safety, hospital-based health promotion, infection prevention, hospital governance

Correspondence:
Jasmin Ambas. Department of Health Administration, Faculty of Sports and Health Sciences, Makassar State University. Jl. Wijaya Kusuma No.14, Banta-Bantaeng, Rappocini District, Makassar City, South Sulawesi 90222, Indonesia. Email: jasmin.ambas@unm.ac.id.

Cite this as:
Ambas J, Widyaningsih YI (2025). Patient Safety and Hospital-Based Health Promotion in Preventing Infections and Their Impact on Childhood Stunting: A Systematic Review. J Epidemiol Public Health, 10(04): 513-524. https://doi.org/10.26911/jepublichealth.2025.10.04.07.

BACKGROUND

Stunting remains a serious global health problem, particularly in developing countries. WHO (2020) estimated that more than 149 million children under the age of five experience stunting, with the highest prevalence found in Asia and Africa. In Indonesia, the prevalence of stunting among children under five remains above 20%, reflecting a major challenge in achieving the Sustainable Development Goals (SDGs) 2030 target (Kemenkes RI, 2022).

One of the key contributing factors to stunting is recurrent infections during the first 1.000 days of life. Gastrointestinal infections, acute respiratory infections, and other infectious diseases have been shown to disrupt nutrient absorption, increase the body's energy requirements, and trigger chronic inflammation that hampers linear growth in children (Adrizain, 2024). Protozoal infections contribute to impaired nutritional status in children and increase the risk of stunting, thus requiring significant attention in prevention and management efforts (Isobel et al., 2025).

In the context of health services, hospitals play an essential role in preventing infections in children. By implementing patient safety principles, including infection control, prevention of cross-infection, and safe clinical management, hospitals can minimize the risk of infection exposure in infants and children, as emphasized in the WHO *Global Patient Safety Report 2024*, which provides the latest overview of global patient safety implementation (WHO, 2024). In addition, integrated health promotion strategies such as educating parents on hygiene, exclusive breastfeeding, immunization, and neonatal care can enhance infection prevention behaviors both in hospitals and at home (Budi et al, 2024; Brillian Milenia et al., 2023).

Theoretically, this study refers to the Health Promotion Theory, which highlights the importance of behavior change, individual empowerment, and the creation of a healthy environment (Koomson, 2024). Furthermore, the concept of patient safety developed under the WHO Patient Safety Framework serves as a reference to understand how risk management and clinical practices in hospitals can affect children's long-term health (WHO, 2024).

Although numerous studies have discussed nutrition, behavior, and environmental factors related to stunting, as well as infection control in hospitals, no systematic review has specifically examined the role of patient safety and hospital-based health promotion in preventing infections and their impact on stunting in children. This indicates a research gap that needs to be addressed.

Therefore, the objective of this study is to synthesize the latest scientific evidence on the contribution of patient safety and hospital based health promotion to infection prevention and its impact on child stunting through a systematic review.

SUBJECTS AND METHOD

1. Study Design

This research applied a systematic literature review approach in accordance with the PRISMA guidelines. The article search was conducted through Scopus, ScienceDirect, and Google Scholar databases. The search process used Medical Subject Headings (MeSH) based terminology adjusted to each database's indexing system.

The combination of search terms included: "patient safety" AND "hospital-based health promotion" AND "infection prevention" AND "childhood stunting", and "hospital governance" AND "infection control" AND "child growth". The review was directed to identify empirical evidence

describing how hospital-based health promotion initiatives and patient safety interventions contribute to infection control and the prevention of stunting in children.

PICO framework was adopted to define the focus of the review:

a. Population (P): Patients, health workers, and communities exposed to infection risk
b. Intervention (I): Implementation of hospital-based health promotion and infection prevention programs
c. Comparison (C): Absence of or limited application of health promotion and safety interventions
d. Outcome (O): Decreased incidence of infection and reduced prevalence of stunting among children.

2. Inclusion Criteria

The inclusion process considered studies that met the following conditions:

a. Articles published between 2020 and 2025
b. Research examining patient safety or hospital-based health promotion linked to infection prevention and stunting reduction
c. Full-text accessible papers (PDF format).
d. Written in English or Indonesian
e. Original empirical research, including observational or intervention studies.

3. Exclusion Criteria

Publications that did not meet the eligibility requirements were excluded from the review. This included studies that were unavailable in full-text form, articles categorized as literature reviews, conference abstracts, editorials, or commentaries. In addition, papers that did not examine outcomes related to infection control or childhood stunting were omitted. Studies focusing on nonhuman subjects or conducted outside the hospital context were also excluded from the analysis.

4. Operational Definition of Variable

Patient Safety: Hospital-driven practices aimed at minimizing healthcare associated infections and adverse outcomes.

Hospital-Based Health Promotion: Educational or behavioral interventions implemented in healthcare settings to enhance infection prevention.

Infection Prevention: Evidence-based measures applied in hospitals to control and reduce transmission of infectious diseases.

Childhood Stunting: A condition of impaired linear growth due to recurrent infections and inadequate healthcare exposure.

5. Study Instruments

The PRISMA Flow Diagram was used to track the selection and screening process. From an initial identification of 500 studies**,** 120 were retained after title and abstract screening. Following full-text assessment, 45 studies were reviewed for eligibility, and 20 were finally included for synthesis.

The Joanna Briggs Institute (JBI) Critical Appraisal Checklist was used to assess methodological quality. Cross-sectional studies were rated using an 8-item tool (score range: 0–16), while case-control designs applied a 10-item checklist (score range:0–20). Most included studies demonstrated strong methodological quality, ensuring reliability of the synthesized results.

6. Data Analysis

Data extraction was carried out systematically in Microsoft Excel, covering author names, year of publication, study setting, design type, sample size, and main outcomes. The findings were analyzed using a narrative thematic approach, highlighting recurring issues, intervention effectiveness, and identified challenges. Cross-study comparison was used to describe patterns

and direction of relationships between patient safety, infection prevention, and stunting outcomes.

RESULTS

This study adopted the PRISMA approach, which involved a structured four-phase process to ensure transparency and rigor in article selection. Figure 1 presents the PRISMA flow diagram illustrating each stage of the screening and inclusion process.

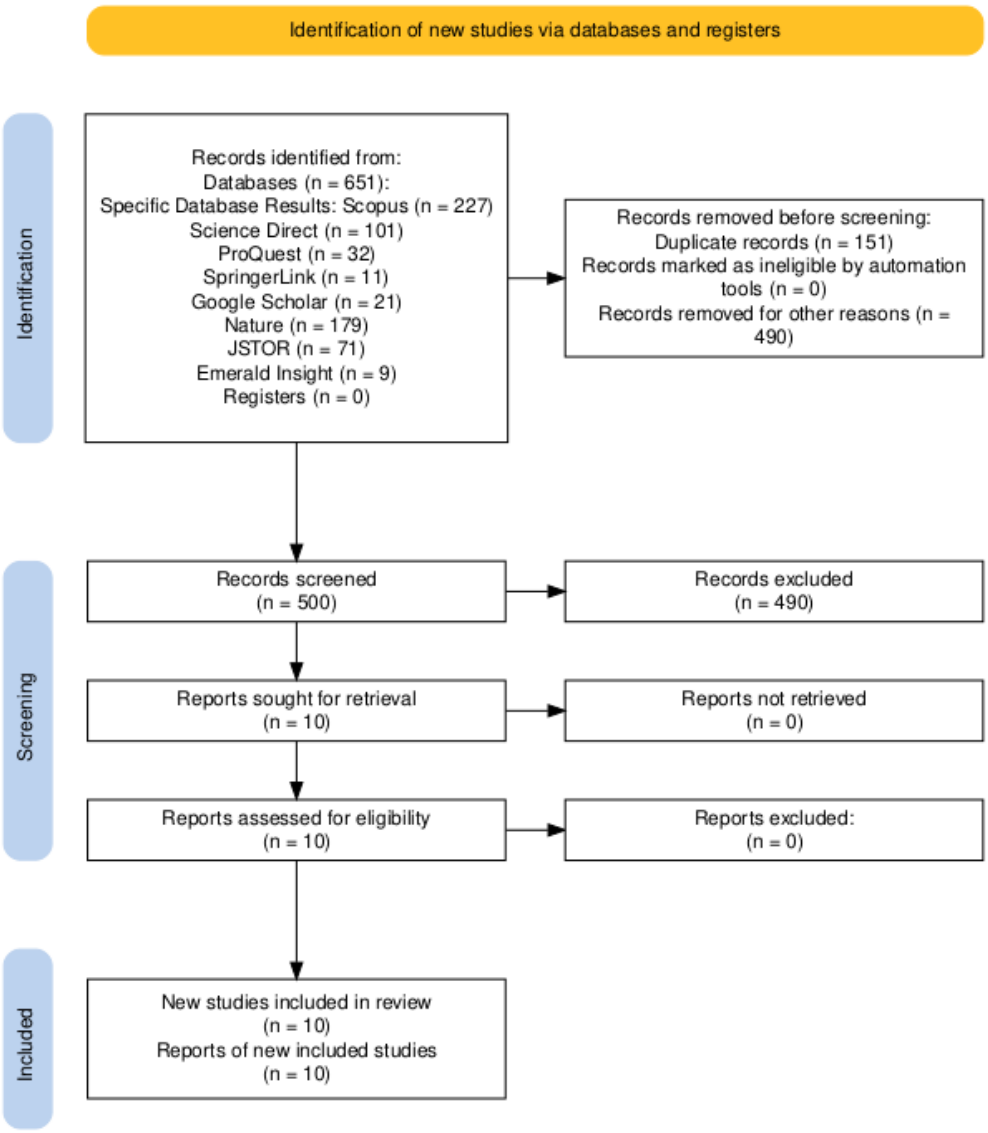

Figure 1. PRISMA flow diagram of the study selection process

In the identification stage, a comprehensive literature search was carried out across multiple academic databases, including Scopus, ScienceDirect, and Google Scholar. The search strategy employed a combination of keywords and Medical Subject Headings (MeSH) adapted to the structure of each database. The terms used were *"patient safety," "hospital-based health promotion," "infection prevention,"* and *"childhood stunting."* This initial search yielded a total of 500 relevant articles.

In the filtering stage, the identified articles were screened based on predefined inclusion criteria. Eligible studies were those aligned with the research variables, published between 2020 and 2025, available in full-text, and focused on infection prevention, patient safety, or hospital-based health promotion in relation to stunting reduction.

During the eligibility stage, full-text articles were reviewed against exclusion criteria. Studies were excluded if they were not available in complete form, or if they were literature reviews, editorials, conference abstracts, or commentaries. Articles that did not examine infection outcomes or failed to address the relationship between infection control and childhood stunting were also omitted.

Finally, in the selection stage, 20 high-quality empirical studies were identified as meeting all criteria. Each selected article was further evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal Tool to ensure methodological rigor. The selected studies were synthesized to explore the role of patient safety and hospital-based health promotion programs in preventing infections and reducing stunting prevalence among children.

Figure 1 illustrates the PRISMA flow diagram of the study selection process, outlining the number of records identified, screened, assessed for eligibility, and finally included in the systematic review.

Figure 2. Geographic distribution of studies included in the systematic review on infection prevention and stunting reduction

The methodological quality of the included studies was evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal Tool. This assessment ensured that only studies with strong research design, appropriate data analysis, and clear outcome reporting were included in the synthesis. Based on the appraisal, 20 high-quality empirical studies were selected, focusing on the role of patient safety and hospital-based health promotion in preventing infections and reducing childhood stunting.

Tables 1 and 2 present the results of the critical appraisal assessment for both

cross-sectional and intervention-based studies included in this systematic review.

Table 1. The results of the critical appraisal assessment for cross-sectional studies

Author (Year)	Criteria								
	1	2	3	4	5	6	7	8	Total
Gizaw et al. (2022)	2	2	2	2	2	1	2	2	15
Azriani et al. (2024)	2	2	2	2	2	2	2	2	16
Adrizain et al. (2024)	2	2	2	2	2	1	2	2	15

Description of the question criteria for cross-sectional studies:

1 = Were the criteria for inclusion in the sample clearly defined?
2 = Were the study subjects and the setting described in detail?
3 = Was the exposure (infection/health promotion intervention) measured in a valid and reliable way?
4 = Were objective, standard criteria used for the measurement of outcomes (stunting or infection)?
5 = Were confounding factors identified?
6 = Were strategies to address confounding factors clearly described?
7 = Were the outcomes measured in a valid and reliable way?
8 = Was an appropriate statistical analysis used?

Answer score description:

0 = No
1 = Can't tell
2 = Yes

Table 2. The results of the critical appraisal assessment for intervention-based studies

Author (Year)	Criteria										
	1	2	3	4	5	6	7	8	9	10	Total
Soviyati et al. (2023)	2	2	2	2	2	2	2	1	2	2	17
Viesta et al. (2024)	2	2	2	2	2	2	2	2	2	2	18

Description of the question criteria for Case Control:

1 = Were the groups similar at baseline or were differences accounted for in the analysis?
2 = Were participants exposed to similar interventions other than the one of interest?
3 = Was the intervention clearly described and delivered consistently?
4 = Were outcomes (infection prevention, knowledge, or stunting-related behavior) measured in a valid and reliable way?
5 = Were outcome measures taken before and after the intervention?
6 = Were follow-up periods sufficient to observe changes?
7 = Were confounding factors identified and controlled?
8 = Was statistical analysis appropriate to measure the effect?
9 = Was the study result reported clearly and completely?
10 = Was the intervention clearly described and delivered consistently?

Answer score description:

0 = No
1 = Can't tell
2 = Yes

Table 3 presents a summary of the studies included in this systematic review, which examined the role of patient safety practices and hospital-based health promotion in infection prevention and their impact on childhood stunting. Based on the synthesis results, several studies demonstrated that infection control programs and educational interventions within hospital settings were effective in reducing infection rates among neonates and young children, thereby lowering the risk of stunting.

The findings highlight that factors such as environmental sanitation, parental knowledge, and health education initiatives significantly influenced child growth outcomes. Moreover, the integration of patient safety policies and preventive care into hospital administration contributed to improved service quality and family engagement in stunting prevention. One study emphasized that while nutritional interventions alone were beneficial, combined approaches involving infection prevention and health promotion yielded greater and more sustainable impacts on child growth and health.

Table 3. Summary of Relevant Articles on Patient Safety, Hospital-Based Health Promotion, Infection Prevention, and Stunting

Author (Year)	Study Design	Country	P	I	C	O	Result	View
Raj et al. (2022)	Systematic Review	Global / Multiple Countries	Children from various regions	Helminth infection	Children without helminth infection	Stunting and wasting	No significant overall evidence that helminth infection causes stunting, although an association with wasting was found	No strong link between helminth infection and stunting
Gizaw et al. (2022)	Cross-Sectional	Ethiopia (Rural)	Children aged 24–59 months	Poor sanitation, enteric infections, and environmental enteric dysfunction (EED)	Children with good sanitation and no enteric infections	Stunting prevalence	Stunting was significantly associated with poor sanitation, enteric infections, and EED	Environmental and infection factors play a major role
ESoviyati et al. (2023)	Experimental / Intervention Study	Indonesia	Families and caregivers of children under five	Application of Health Promotion Model	Conventional behavior (no intervention)	Behavior change in stunting prevention	The health promotion model effectively influenced stunting prevention behaviors	Health promotion improves preventive behavior
Azriani et al. (2024)	Cross-Sectional	Southeast Asia / Asia	Children under five	History of infection (diarrhea, fever)	Children without infection	Stunting incidence	Infections (diarrhea, fever) were among health factors associated with stunting	Infections significantly increase stunting risk

Author (Year)	Study Design	Country	P	I	C	O	Result	View
Aisyah et al. (2025)	Review	Global / Developing Countries	Children under five	Exposure to infection, malnutrition, poor hygiene	Adequate nutrition and infection control	Stunting and growth outcomes	Identified infection as one of the multifactorial causes of stunting	Infections are a key contributor to stunting
Jeong et al. (2023)	Systematic Review	Low- and Middle-Income Countries (LMICs)	Families with young children	Father-inclusive health promotion interventions	Families without father-inclusive programs	Maternal, paternal, and child outcomes	Interventions showed positive impacts on caregiving, couple relations, and child development	Engaging fathers strengthens child health outcomes
Fadhila et al. (2024)	Scoping Review	Developing Countries	Children under five	Acute respiratory infections	Children without respiratory infections	Stunting incidence	Acute respiratory infections were linked to stunting in young children	Infections contribute to growth faltering
Imam et al. (2025)	Review	Global	Neonates in LMICs	Neonatal infections	Neonates without infection	Neonatal mortality	Neonatal mortality remains very high, mainly due to infections and weak health systems	Infection control is essential to reduce mortality
Viesta et al. (2024)	Quasi-Experimental	Indonesia	Health cadres at Integrated Health Post	Training using Nutrition Disc media	Cadres without training	Knowledge and skills improvement	Health cadre training significantly improved knowledge with measurable outcomes	Health education tools enhance cadre competence
Adrizain et al. (2024)	Cross-Sectional	Bandung, Indonesia	Children in Bandung Regency	Intestinal worm infection and deworming program	Children without worm infection	Stunting incidence	Worm infections were associated with stunting, influenced by socioeconomic factors and deworming	Socioeconomic and infection control both affect stunting

Table 3 summarizes the articles that met the inclusion criteria in this review. In general, these studies originated from various countries, including Ethiopia, Southeast Asia, and developing nations globally, and several were conducted in Indonesia, focusing on the relationship between infections, health promotion, and the incidence of stunting in children.

Raj et al. (2022), in a global systematic review, concluded that there is no consistent evidence that helminth infection directly causes stunting, although an association with wasting was identified. This finding is reinforced by Gizaw et al. (2022) in Ethiopia, who emphasized the role of poor sanitation, enteric infections, and EED in stunting.

In Indonesia, Soviyati et al. (2023) and Azriani et al. (2024) demonstrated that health promotion models and infection-related risk factors (diarrhea, fever) are closely associated with both the prevention and incidence of stunting. Meanwhile,

Aisyah et al. (2025) highlighted that stunting is influenced by multifactorial causes, including infections.

Several global studies pointed to the direct link between infectious diseases and child growth. Fadhila et al. (2024) emphasized the role of acute respiratory infections in developing countries. Imam et al. (2025) also stressed that neonatal infections remain a leading cause of morbidity and mortality among newborns in LMICs.

Beyond medical factors, social and caregiving aspects also contribute. Jeong et al. (2023) showed that father-inclusive interventions in low and middle-income countries had positive impacts on caregiving practices, couple relationships, and child development. At the community level, Viesta et al. (2024) confirmed that training health cadres significantly improved their knowledge in stunting prevention.

Overall, findings from these studies demonstrate that infections are a critical factor in stunting, both through direct pathways (inflammation, malabsorption, ARIs, diarrhea) and indirect ones (unhealthy environments, poor sanitation, weak health systems). At the same time, health promotion interventions, cadre training, and family involvement have been proven effective in enhancing stunting prevention efforts, particularly in developing countries, including Indonesia.

DISCUSSION

This systematic review confirms that infections play a critical role as one of the determinants of stunting, both through direct and indirect mechanisms. The infection nutrition pathway theoretically explains that children experiencing recurrent infections such as diarrhea, Acute Respiratory Infections (ARIs), or intestinal parasitic infections are prone to chronic inflammation, nutrient malabsorption, and increased energy requirements, which ultimately contribute to growth faltering (Gizaw et al., 2022; Luthfia Retno et al., 2025; Fadhila et al., 2024).

The findings of this review are consistent with Gizaw et al. (2022), who demonstrated the association of poor sanitation, enteric infections, and environmental enteric dysfunction (EED) with stunting in Ethiopia. This aligns with the study by Fadhila et al. (2024), which identified a significant relationship between ARIs and stunting among young children in developing countries. Furthermore, Luthfia Retno et al. (2025) highlighted that intestinal parasitic infections may impair child growth through chronic malabsorption. These findings emphasize that although undernutrition is often cited as the primary cause of stunting, infections must not be overlooked as a major determinant.

On the other hand, this review also reveals that hospital- and community-based health promotion interventions contribute substantially to infection prevention and reduced stunting risk. Soviyati et al. (2023) and Azriani et al. (2024) in Indonesia highlighted the effectiveness of health promotion models in improving stunting prevention behaviors, particularly hygienic practices and infant care. Jeong et al. (2023) added the perspective that father involvement in parenting in low- and middle-income countries positively affects not only children but also family relationships, indirectly supporting child health. Moreover, cadre training (Viesta et al., 2024) was found to be effective in enhancing knowledge on stunting prevention, underscoring the importance of community empowerment integrated with health services.

Therefore, stunting prevention requires a holistic approach involving not only nutrition-specific interventions but also behavioral change, environmental

improvements, and family and community empowerment. Integrated and multi-sectoral community-based programs have been proven effective in accelerating stunting reduction (Mepsa P. et al., 2024; Dedi M. et al., 2025).

The role of hospital infection control protocols as a patient safety strategy

One of the key findings of this review is that patient safety in hospitals is strongly linked to the implementation of infection control protocols. Hospital-based interventions such as hand hygiene practices, the use of antiseptics in neonatal care, timely immunization, and proper management of diarrheal diseases or ARIs have been proven to reduce the risk of infections in neonates and young children. This aligns with the theory of hospital-based patient safety, where hospitals serve not only as curative institutions but also as centers for infection prevention that directly contribute to child health promotion.

Findings from Imam et al. (2025) indicate that neonatal infections remain a leading cause of mortality in low- and middle-income countries due to weak infection control systems. By strengthening patient safety protocols, hospitals can break the chain of infection transmission, thereby supporting optimal child growth during the first 1,000 days of life. This is consistent with studies from Indonesia (Soviyati et al., 2023; Viesta et al., 2024), which emphasize that patient education, community health worker empowerment, and effective communication between healthcare providers and families are key factors in the success of hospital-based health promotion.

Thus, hospital-based patient safety strategies focusing on infection prevention carry dual implications: protecting patients from short-term infection-related complications while simultaneously preventing the long-term impact of stunting. This approach reinforces the role of hospitals as key actors in integrating clinical, administrative, and health promotion efforts oriented toward prevention (Barbaros Yet et al., 2024).

Limitations, conclusion, and policy implications

This study has several limitations. First, most of the included articles employed observational designs with varied outcome indicators, which limits the ability to establish causal relationships. Second, much of the data was derived from developing countries with heterogeneous socio-economic contexts and health systems, which requires caution in generalizing the findings to all settings. Third, restricted access to some articles may have excluded potentially relevant evidence from the analysis.

Nevertheless, this review provides an important conclusion that infections are a significant determinant of stunting, both directly and indirectly. Hospital-based health promotion and the implementation of patient safety protocols emerge as crucial strategies to break this cycle. The policy implication is the urgent need to strengthen hospital programs on health promotion and patient safety, integrated with community-based interventions, including health worker training and male involvement in childcare.

A key recommendation is the necessity for future research with longitudinal or stronger interventional designs to assess the direct impact of infection prevention on reducing stunting prevalence, while also informing health policies that more effectively integrate child nutrition and infection control.

AUTHOR CONTRIBUTION

Ambas J conceptualized the study, determined the topic, and conducted the lite-

rature search. Ambas J collected the articles, performed data extraction, and contributed to the initial draft of the manuscript. Widyaningsih YI assessed the methodological quality of the included studies, conducted data synthesis, and contributed to the writing and refinement of the manuscript. Both authors reviewed, revised, and approved the final version of the paper for submission.

ACKNOWLEDGMENT

The authors sincerely express their gratitude to the colleagues and experts who contributed valuable insights and constructive feedback throughout the preparation of this review. Appreciation is also extended to the institutions that generously provided access to databases and reference materials that were essential in supporting this research.

FUNDING AND SPONSORSHIP

The author confirms that no external financial support was received from any institution.

CONFLICT OF INTEREST

The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

REFERENCE

Adrizain R, Faridah L, Fauziah N, Berbudi A, Afifah DN, Setiabudi D, Setiabudiawan B (2024). Factors influencing stunted growth in children: A study in Bandung regency focusing on a deworming program. Parasite Epidemiol Control. 4:26(e00361). doi: 10.1016/j.parepi.2024.e00361.

Azriani D, Masita, Qinthara NS, Yulita IN, Agustin D, Zuhairini Y, Dhamayanti M (2024). Risk factors associated with stunting incidence in children under five in Southeast Asia: a scoping review. J Health Popul Nutr. 55(1): 23–34. doi: 10.1186/s41043-024-00-656-7.

Santoso EB, Desi NM (2024). Textbook of Health Promotion and Health Education (In Indonesia). Pasuruan: Basya Media Utama.

Fadhila AK, Rahfiludin MZ, Suyatno (2024). Child stunting against acute respiratory infections in developing countries: A scoping review. J Matern Child Health. 13(3). 215–224. doi: 10.6000/1929-4247.2024.13.03.3.

Imam FB, Darmstadt GL, Zaidi AKM (2025). 2 - Neonatal infections: A global perspective. Remington and Klein's Infectious Diseases of the Fetus and Newborn Infant (Ninth Edition). 21-53. doi:10.1016/B978-0-323-79525-8.00011-1.

Gizaw Z, Yalew AW, Bitew DB, Lee J, Bisesi M (2022). Stunting among children aged 24–59 months and associations with sanitation, enteric infections, and environmental enteric dysfunction in rural northwes Ethiopia. Scientific Reports. 12(19293). doi: 10.1038/s41598-022-23981-5.

Jeong J, Sullivan EF, McCann JK (2023). Effectiveness of father inclusive interventions on maternal, paternal, couples, and early child outcomes in low- and middle-income countries: A systematic review. Soc Sci Med. 7(5): 320–334.doi:10.1016/j.socscimed.20-23.115971.

Ministry of Health of the Republic of Indonesia (2022). National Report of Basic Health Research (Riskesdas) 2022 (In Indonesia). Jakarta: Health Research and Development Agency, Ministry of Health of the Republic of Indonesia.

Koomson I, Afoakwah C, Twumasi MA (2024). Racial diversity, child stunting and underweight: Policies design and promotion in South Africa. J Policy Modeling. 46(6). doi: 10.1016/-j.jpolmod.2024.05.009.

Putri BMH, Mahirasani DS, Fadlan M, Widiastuti NMS, (2023). Efforts to increase parents' knowledge about toddler's diarrhea through role play as a method of community education in Jatisari Village, Pakisaji District. J Community Health Preventive Med. 3(2):55-68. https://doi.org/10.21776-/ub.jochapm.2023.003.02.2.

Mulyani AT, Khairinisa MA, Khatib A, Chaerunisaa AY (2025). Understanding Stunting: Impact, Causes, and Strategy to Accelerate Stunting Reduction-A Narrative Review. Nutrients. 17(9):1493. doi:10.3390/-nu17091493.

Raj E, Calvo-Urbano B, Heffernan C, Halder J, Webster JP (2022). Systematic review to evaluate a potential association between helminth infection and physical stunting in children. Parasit Vectors. 15(1):135. https://-doi.org/10.1186/s13071-022-05235-5.

Ramadyani LR, Muh F, Martini (2025). The role of infectious diseases in stunting incidence. Juriskesbdg. 17(2). doi: 10.34011/juriskesbdg.v17i2.2896.

Soviyati E,.Sulaeman ES, Sugihardjo Ir, Wiboworini B (2023). Effect of applying the health promotion model in stunting prevention and behavior control. J Edu Health Promot. 4(2). doi: 10.4103/jehp.jehp_276_23.

Dewi AVN, Kharisa A, Khasanah AH, Maharani AD, Annisa AC, Habiba C, Dinanti D et al. Nutrition disc as media for increasing skills of integrated health post cadres at Jaten II Community Health Center, Karanganyar, Central Java, Indonesia. IJM. 9(3). doi: 10.26911/theijmed.2024.-9.3.661.

World Health Organization. 2020. Levels and trends in child malnutrition: Key findings of the 2020 edition. Geneva: WHO.

World Health Organization. 2024. Global patient safety report 2024. Geneva: WHO. https://www.who.int/publications/i/item/9789240095458.

Putra M, Rekawati E, Permatasari H, Sari IP (2024). Empowering Community Health Workers to Reduce Stunting Among Toddlers: Systematic Review. Jurnal Ilmu dan Teknologi Kesehatan. 11(2).: 187-196. https://doi.org/10.32-668/jitek.v11i2.1462.

Syam DM, Bungawati A (2024). The effectiveness of community-led total sanitation cadre intervention in improving stunting knowledge and behavior. Healthcare in Low-Resource Settings. 13(s1). doi: 10.4081/hls.-2024.13109.

Yet B, Baserdem EO, Rosenstock (2024). Secondary data analysis using Evidence-Based Bayesian Networks with an application to investigate the determinants of childhood stunting. Expert Systems with Applications. 256 (124940). doi: 10.1016/j.eswa.20-24.124940.