

Stunting and Child Development in Educational Contexts: A Socioecological Review Based on Bronfenbrenner's Theory

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Received: May 2026 ; **Revised:** June 2026;
Accepted: July 2026 ; **Published:** August 2026

Abstract

Stunting is a multidimensional developmental condition that has long-term consequences for children's cognitive functioning, language development, and school readiness within educational contexts. This article aims to review the impact of stunting on child development in Indonesia using Bronfenbrenner's ecological systems theory as a socioecological framework. A systematic literature review with a narrative synthesis approach was employed. Literature searches were conducted using Google Scholar, PubMed, Scopus, SINTA, and Garuda, covering studies published between 2013 and 2026 that addressed stunting and its implications for child development and education. The findings were analyzed by categorizing evidence across ecological levels, including the microsystem, mesosystem, exosystem, and macrosystem. The synthesis reveals that stunting is associated with reduced cognitive performance by approximately 0.56-0.82 standard deviations, delayed school entry, and persistent regional disparities in educational outcomes. These effects are exacerbated by weak coordination among families, schools, health services, and policy frameworks. This review proposes a socioecological model emphasizing integrated psychoeducational interventions across sectors. The study concludes that addressing stunting requires moving beyond a nutrition-centered approach toward a holistic, education-sensitive strategy that considers children's developmental environments in order to mitigate long-term educational disadvantages and human resource inequality in Indonesia.

Keywords: *Stunting, Child Development, Education, Bronfenbrenner's Theory.*

INTRODUCTION

Stunting cannot be viewed merely as a chronic nutritional problem, but rather as a multidimensional child development disorder, particularly in Indonesia, where the national prevalence reached 19.8% in 2024 according to the Indonesian Nutrition Status Survey (SSGI) down from 21.5% in 2023 yet still affecting approximately 4.8 million infants. Inadequate nutritional intake and recurrent infections during the first 1,000 days of life permanently hinder both physical growth and cognitive development¹. The impacts include disrupted emotional regulation due to the mother's psychological condition and suboptimal caregiving practices², reduced learning readiness that impedes long-term human resource productivity, and children's educational experiences hindered by early psychosocial vulnerabilities³. Thus, stunting shapes a child's developmental trajectory from the earliest stages of life, affecting not only individual capacity but also the child's readiness to respond to the demands of the learning environment and educational interactions in subsequent developmental stages.

The educational context plays a crucial role within the mesosystem in fostering the development of integrated psychoeducational interventions that link the family microsystem with the policy macrosystem to reduce regional disparities⁴. This is because the educational environment serves as a developmental space that functions not only as a venue for knowledge transfer but also as an arena for the ongoing development of children's cognitive capacities, emotional regulation, and social adaptation. In this context, regional disparities do not merely reflect differences in access to services, but also differences in the quality of developmental experiences children receive during their growth, development, and learning processes.

Stunting is associated with reduced cognitive ability in children, as reflected in low intelligence quotient (IQ) and impairments in executive function such as attention control and working memory which limit learning ability and academic achievement⁵. This condition is also linked to delayed language development, including speech delay, limited vocabulary, and poor verbal communication skills⁶. These developmental barriers arise through the interaction of biological factors, parenting styles, family stimulation, and the educational environment across various layers of the socioecological system. However, previous studies have tended to address cognitive and language aspects separately, resulting in a conceptual lack of integration regarding stunting within an educational context.

¹ Deda, Y. N., Nahak, M. P. M., & Pala, A. (2024). Global trend of stunting in the last decade: A bibliometric analysis. *Amerta Nutrition*, 8(4), 654–664. <https://doi.org/10.20473/amnt.v8i4.2024.654-664>

² Amatullah, T. A., & Indriyani, S. A. K. (2024). Literature review: Risk factors of stunting in children under five years old and how to prevent. *Jurnal Biologi Tropis*, 24(1b), 746–757. <https://doi.org/10.29303/jbt.v24i1b.7911>

³ Mulyaningsih, T., Mohanty, I., Widyaningsih, V., Gebremedhin, T. A., Miranti, R., & Wiyono, V. H. (2021). Beyond personal factors: Multilevel determinants of childhood stunting in Indonesia. *PLoS ONE*, 16(12), Article e0260265. <https://doi.org/10.1371/journal.pone.0260265>

⁴ Gabriela, R., Giselia, A., Bruna, M., & Marilia, D. C. L. (2023). Determining factors of child linear growth from the viewpoint of Bronfenbrenner's bioecological theory. *Jurnal de Pediatria*, 99(3). <https://doi.org/10.1016/j.jpmed.2022.10.009>

⁵ Sumartini, E. (2020). Dampak stunting terhadap kemampuan kognitif anak: Studi literatur. Dalam *Prosiding Seminar Nasional Kesehatan: Peran Tenaga Kesehatan dalam Menurunkan Kejadian Stunting* (hlm. 127–134). STIKes Respati.

⁶ Kirana, J. S., Flora, R., & Fajar, N. A. (2025). Hubungan stunting dengan keterlambatan perkembangan bahasa pada anak usia 6–36 bulan: A systematic review. *Jurnal Kesehatan Masyarakat*, 4, 306–316.

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Although numerous empirical studies have demonstrated that stunting is associated with adverse developmental outcomes, the existing body of research remains fragmented in its conceptualization of the phenomenon. For instance,⁷ emphasized that chronic undernutrition during early childhood contributes to long-term deficits in cognitive development and educational attainment. Similarly,⁸ through a literature review, reported that stunted children tend to exhibit lower cognitive performance, particularly in memory, attention, and problem-solving abilities. More recently,⁹ found a significant association between stunting and delayed language development among children aged 6–36 months, indicating that nutritional deficits may interfere with verbal communication and early learning processes. Furthermore,¹⁰ demonstrated that stunting is associated with a decline in cognitive scores of approximately 0.56–0.82 standard deviations and an increased likelihood of delayed school entry among Indonesian children.

Despite these important contributions, most previous studies have examined developmental outcomes in isolation, focusing primarily on specific domains such as cognitive performance, language development, or nutritional status. In addition, the majority of studies adopt a biomedical perspective that conceptualizes stunting as an individual health condition, with limited attention given to the broader environmental contexts in which child development occurs. As a result, the interactions between family environments, educational settings, community resources, and policy structures remain insufficiently integrated into explanations of how stunting affects children's developmental and educational trajectories.

Consequently, there is still a lack of socioecological understanding regarding how multiple environmental systems collectively shape the developmental experiences of children affected by stunting. This gap is particularly evident in educational research, where stunting is rarely analyzed through a comprehensive developmental framework that incorporates family, school, community, and policy influences simultaneously. Therefore, a review grounded in Bronfenbrenner's ecological theory is needed to synthesize existing evidence and provide a more holistic understanding of the relationship between stunting and child development within educational contexts.

The family environment, parenting styles, the quality of stimulation, and children's interactions with the school environment are often treated merely as supporting factors, rather than as integral parts of the developmental process. In reality, children's cognitive and language

⁷ Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., Ezzati, M., Grantham-McGregor, S., Katz, J., Martorell, R., Uauy, R., & Maternal and Child Nutrition Study Group. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427–451. [https://doi.org/10.1016/S0140-6736\(13\)60937](https://doi.org/10.1016/S0140-6736(13)60937)

⁸ Sumartini, E. (2020). Dampak stunting terhadap kemampuan kognitif anak: Studi literatur. Dalam *Prosiding Seminar Nasional Kesehatan: Peran Tenaga Kesehatan dalam Menurunkan Kejadian Stunting* (hlm. 127–134). STIKes Respati.

⁹ Kirana, J. S., Flora, R., & Fajar, N. A. (2025). Hubungan stunting dengan keterlambatan perkembangan bahasa pada anak usia 6–36 bulan: A systematic review. *Jurnal Kesehatan Masyarakat*, 4, 306–316.

¹⁰ Hidayah, N., Sari, N., Pratama, D., Wijaya, S., Nugroho, A., & Santoso, B. (2024). Stunting and its association with education and cognitive outcomes among children in Indonesia. *PLoS ONE*, 19(5), Article e0295380. <https://doi.org/10.1371/journal.pone.0295380>

development, as well as their readiness to learn, are shaped through ongoing interactions between their individual characteristics and the social and educational environments surrounding them. When the educational environment is not considered in its entirety, analyses of the impact of stunting on children's learning processes become fragmented and fail to reflect the complexity of children's development in daily life¹¹.

Given this phenomenon, a more contextual developmental psychology approach is needed to understand stunting as a phenomenon occurring within the child's environmental network. Bronfenbrenner's ecological theory of development offers a conceptual framework that enables a more comprehensive understanding of stunting by situating child development within the interplay of interconnected microsystems, exosystems, and macrosystems. Through this approach, stunting is understood not merely as an individual condition, but as the result of complex environmental dynamics, including the role of the educational environment as a critical space in shaping children's learning capacity and development.

Bronfenbrenner's ecological theory of development provides a comprehensive framework for understanding stunting by conceptualizing child development as the result of dynamic interactions between the individual and multiple environmental systems, including the microsystem, mesosystem, exosystem and macrosystem. The microsystem encompasses the child's immediate environment, such as family and school. The mesosystem represents the relationships between these environments, particularly the interplay between family and school in supporting the child's development and readiness for learning. The exosystem includes social structures that influence the child indirectly, such as parents' employment conditions and health services. Meanwhile, the macrosystem reflects the cultural values, policies, and socioeconomic conditions that shape the context of child development.

Unlike previous studies that primarily examined the nutritional, cognitive, or language-related consequences of stunting separately, this review integrates evidence across multiple ecological levels using Bronfenbrenner's ecological systems theory. By synthesizing findings from family, school, community, and policy contexts simultaneously, this study offers a more comprehensive understanding of how stunting influences children's developmental and educational trajectories. This socioecological perspective contributes to literature by bridging the gap between health-oriented stunting research and educational development studies. Therefore, this article aims to conduct a socioecological review of the impact of stunting on child development within the context of education in Indonesia, as well as to formulate implications for the development of more holistic and context-specific psychoeducational interventions.

METHOD

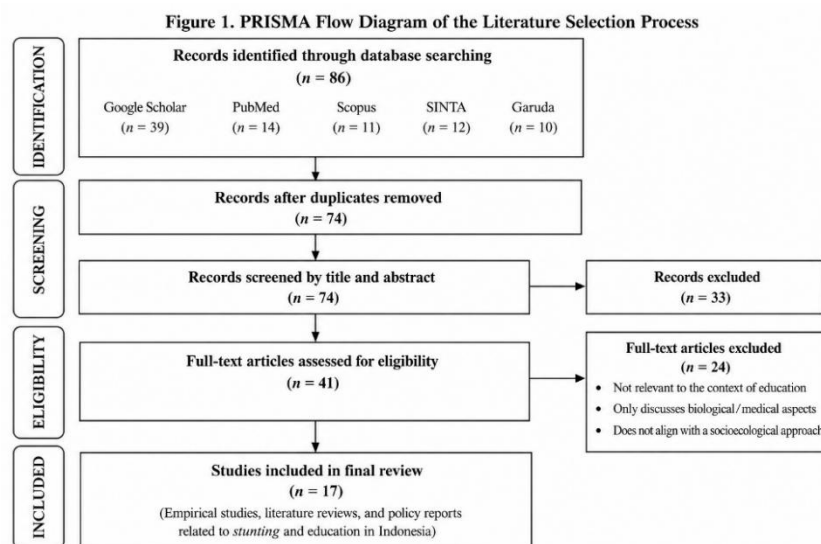
This study employs a systematic literature review (SLR) with a narrative synthesis approach grounded in Bronfenbrenner's ecological theory of development. This approach was selected because it enables the systematic integration of findings across studies to understand the complex

¹¹ Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

and multidimensional relationship between stunting and children's education¹². Bronfenbrenner's ecological framework is used to interpret stunting as a developmental condition influenced by multilayered interactions between individuals and their environments, making it particularly relevant for examining the educational implications of stunting within family, school, community, and policy contexts¹³.

A systematic literature search was conducted using Google Scholar, PubMed, and Scopus, as well as national repositories including SINTA and Garuda, following the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines¹⁴. The search employed combinations of the keywords "stunting," "education," "cognitive development," "language development," "school readiness," and "Bronfenbrenner" in both English and Indonesian. Publications from 2013–2026 were included to ensure relevance to recent empirical findings and policy developments. The initial search identified 86 records, of which 74 remained after duplicate removal. Following title and abstract screening, 41 full-text articles were assessed for eligibility. Studies were included if they discussed stunting and its implications for child development or educational outcomes, considered environmental influences at the family, school, community, or policy levels, and focused on Indonesian child populations within educational contexts, particularly in regions with relatively high stunting prevalence. Studies focusing exclusively on biomedical or nutritional aspects without educational relevance, lacking alignment with Bronfenbrenner's socioecological framework, or providing insufficient information related to the review objectives were excluded. As a result, 17 studies met the inclusion criteria and were included in the final review. The detailed article selection process is presented in Figure 1.

Figure 1. PRISMA Flow Diagram of the Literature Selection Process



¹²Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26(2), 91–108. <https://doi.org/10.1111/j.1471-1842.2009.00848>

¹³Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. Dalam R. M. Lerner (Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., hlm. 793–828).

¹⁴Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>

Data were extracted and organized according to Bronfenbrenner's ecological system levels, including the microsystem, mesosystem, exosystem, and macrosystem. Narrative thematic synthesis was employed to identify patterns, research gaps, and educational implications associated with stunting¹⁵. Regional contextual differences across Indonesia were also considered to enhance the relevance of the findings to local social and cultural conditions. The quality of the selected studies was evaluated narratively based on their relevance to the review objectives, methodological clarity, and consistency of findings related to the socioecological dimensions of stunting and child development. Methodological rigor was strengthened through source triangulation across multiple databases, systematic article selection procedures, and consistency checking of themes across the included studies. This approach facilitates a comprehensive understanding of stunting within a socioecological framework without direct intervention.

RESULTS AND DISCUSSION

This study employs a systematic literature review using Bronfenbrenner's ecological framework of development to comprehensively understand the impact of stunting, particularly in the context of children's education. The results of the synthesis indicate that stunting cannot be understood merely as a problem of physical growth impairment, but rather as a condition that shapes children's developmental trajectories in multiple layers, ranging from cognitive function and readiness for learning to the continuity of formal education.

Data on stunting prevalence based on the 2024–2025 Indonesia Nutrition Status Survey (SSGI) reveal consistent disparities across regions (Table 1). Provinces on the island of Java show relatively lower prevalence rates, ranging from 19.2% to 24.5%, while regions in eastern Indonesia such as East Nusa Tenggara, Papua, and West Sulawesi record higher rates, ranging from 34.6% to 35.3%. These differences not only reflect variations in public health conditions but also represent structural inequalities in access to health services, education, and environments that support child development. Structural inequalities have direct implications for children's readiness to learn from an early age and their chances of educational success in subsequent stages.

Table 1.

Prevalence Data on Stunting in the Provinces of Java, NTT, Papua, and West Sulawesi

Province	Prevalence of Stunting (%)	Intra-Provincial Range	Data Source
East Java	19,2	7,2x disparitas	16
Central Java	20,7	Wonosobo-Tegal tinggi	17
West Java	24,5	Garut 35,2%-Depok 12,3%	20
NTT	35,3	Structural chronicity	21
Papua	34,6	Up from 29,5%	19

¹⁵Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>

¹⁶Sofiyulloh, S., & Rahmaniati, M. (2024). Faktor kontributor prevalensi stunting: Studi kasus Jawa Timur tahun 2022. *Jurnal Biostatistik, Kependudukan, dan Informatika Kesehatan*, 5(1). <https://doi.org/10.7454/bikfokes.v5i1.1087>

¹⁷Devi, A. C., & Nurvita, S. (2025). Analisis spasial kasus stunting di Provinsi Jawa Tengah. *Jurnal Ilmu Kedokteran dan Kesehatan*, 12(9), 1932–1939.

West Sulawesi	35,0	Low nutritional literacy	18
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1. Family Microsystem: Impaired Cognitive Foundations

At the microsystem level, the family is the immediate environment that plays a fundamental role in a child's development. The literature indicates that stunting is deeply rooted in suboptimal caregiving practices, particularly those related to low maternal education and limited nutritional literacy. Amatullah & Sang Ayu explain that the mother's nutritional status during pregnancy, suboptimal feeding practices, and a history of recurrent infections in the child contribute to impaired cognitive and emotional development from an early age.

The impact of this condition is reflected in the cognitive performance of stunted children. According to a study by Hidayah et al., children with stunting experience a decline in cognitive scores of 0.56–0.82 standard deviations, which is functionally equivalent to losing approximately two years of schooling. These findings indicate that stunting not only affects physical aspects but also has direct implications for children's thinking abilities, concentration, and learning processes. Thus, disruptions within the family microsystem serve as an initial foundation that undermines children's readiness to enter the formal education system.

2. The Family and School Mesosystem: Fragile School Readiness

Interaction between families and schools at the mesosystem level plays a crucial role in determining the learning readiness of children with stunting¹⁹. The study found that stunting is associated with a decline in cognitive scores of 0.56 to 0.8 standard deviations, a loss of approximately two years of schooling, and an average delay in school enrollment of 0.4 years. These findings suggest that stunted children not only face biological challenges but also experience difficulties in the transition from the family environment to school.

However, findings in East Lombok indicate that educational interventions based on parental involvement (parents' involvement in their children's education and development), through coordination among posyandu and health cadres, can improve children's readiness for school²⁰. This intervention demonstrates that a strong relationship between families and schools can serve as a protective factor for children with stunting. Conversely, in regions such as East Nusa Tenggara and Papua, poor coordination among families, schools, and health services leads to children with stunting facing ongoing academic challenges, ranging from low academic readiness to an increased risk of dropping out of school early²¹.

¹⁸Hapzah, H., Asmuni, A., & Nurbaya, N. (2023). Stunting itu bukan hanya pendek: Studi kualitatif persepsi ibu tentang stunting dan faktor penyebabnya. *Jurnal Kesehatan Masyarakat Indonesia*, 18(2), 28–35.

¹⁹Hidayah, N., Sari, N., Pratama, D., Wijaya, S., Nugroho, A., & Santoso, B. (2024). Stunting and its association with education and cognitive outcomes among children in Indonesia. *PLoS ONE*, 19(5), Article e0295380. <https://doi.org/10.1371/journal.pone.0295380>

²⁰Arqam, M. L., Firdaus, A. A., Muslih, A., et al. (2025). Integrating education-based interventions and machine learning for stunting prevention: A case study in East Lombok, Indonesia. *PMC*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC12754223/>

²¹Dinas Kesehatan Provinsi Papua. (2023). Laporan tahunan penanganan stunting di Provinsi Papua. Dinkes Papua.

3. Ecosystem: Barriers to Accessing Educational Services

At the ecosystem level, limitations in education and health infrastructure exacerbate the impact of stunting on children's academic achievement. Analysis of stunting prevalence in West Java reveals clusters of regions with high stunting risk, such as Garut with a prevalence of 35.2% compared to Depok at just 12.3%²². This disparity is closely linked to poor WASH (Water, Sanitation, and Hygiene) infrastructure as well as limited access to screening services and early interventions.

These findings are consistent with those of Hidayah, who demonstrated that stunted children living in areas with limited infrastructure tend to have lower academic achievement and weaker executive function. Thus, an unsupportive environment extends the impact of stunting from the health domain to the educational domain, even after children have reached school age.

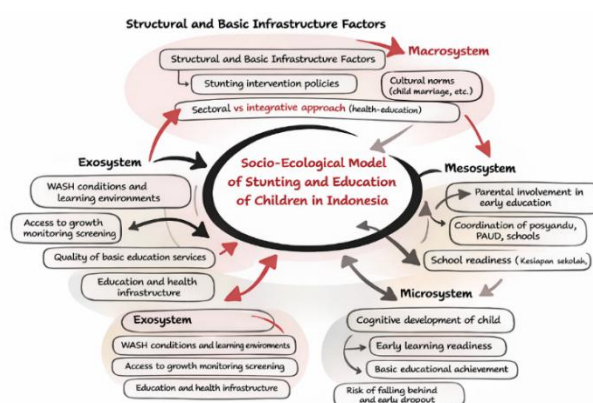
4. Policy Macro-Systems: Sectoral vs. Integrative Approaches

At the macro-system level, national policies addressing stunting remain largely sector specific. Existing interventions primarily focus on nutrition and health, while the dimensions of education and children's cognitive development have not been adequately integrated. Furthermore, cultural norms such as the practice of early marriage in East Nusa Tenggara contribute to the vulnerability to stunting and have not been fully addressed in current policy approaches²³.

Based on Bronfenbrenner's view that individual development is influenced by the dynamic interaction between the individual and the environment across various systems, the target of reducing the prevalence of stunting to 14%, as outlined in the SSGI 2024, must be accompanied by cross-sectoral integration. Without the involvement of the education sector, the long-term impact of stunting on children's learning abilities and cognitive development risks remain unaddressed.

5. A Socioecological Model of Stunting and Education:

Figure 2. Socioecological Model and Early Childhood Education in Indonesia



²²Riznawati, A., Yudhistira, D., & Eryando, T. (2023). Autokorelasi spasial prevalensi stunting di Jawa Barat tahun 2021. *Jurnal Biostatistik, Kependudukan, dan Informatika Kesehatan*, 3(1). <https://doi.org/10.7454/bikfokes.v3i1.1035>

²³Alfy, Z. R., & A'ini, Z. F. (2024). Determinan stunting di Provinsi Nusa Tenggara Timur (NTT) tahun 2022. *EduBiologia: Biological Science and Education Journal*, 4(2), 50. <https://doi.org/10.30998/edubiologia.v4i2.23905>
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As a final synthesis of the research findings, Figure 2 presents a socioecological model of stunting and education developed based on Bronfenbrenner's ecological framework of development. This model demonstrates that stunting cannot be understood merely as a physical growth disorder, but rather as a developmental condition that impacts a child's educational trajectory through the layered interactions between individual characteristics and the environment in which the child grows up. At the microsystem level, stunting is closely related to the quality of caregiving, nutritional status, and the intensity and quality of cognitive stimulation within the family, which directly shapes the child's foundational capacities in executive function, emotional regulation, attention, and readiness to learn²⁴. These findings reinforce the view that educational barriers for children with stunting have their roots in the early stages of development, before children enter the formal education system.

However, the impact at the microsystem level does not exist in isolation; rather, it interacts with broader relational and institutional contexts. At the mesosystem and exosystem levels, as illustrated in Figure 2, the relationships between families, schools, and health services act as mediating mechanisms that determine whether the developmental risks associated with stunting are minimized or, conversely, exacerbated. Weak coordination between systems including limited growth and development screening, low parental involvement in the educational process, and inequities in access to early childhood education services have been shown to increase the risk of poor school readiness, delayed school entry, and academic adjustment difficulties²⁵. Findings across regions indicate that stunted children living in environments with limited institutional support tend to experience cumulative learning barriers, thereby highlighting that stunting acts as a developmental risk factor whose effects are exacerbated by an unresponsive educational context.

These layered interactions from the microsystem to the exosystem are ultimately shaped by broader contextual influences. At the macrosystem level, this model highlights the role of structural factors, policies, and sociocultural norms in perpetuating the vulnerability of stunted children within the educational context. Stunting mitigation policies, which remain largely sectoral and predominantly focused on physical health indicators, have not yet fully integrated the long-term implications for children's cognitive development, psychosocial well-being, and educational continuity²⁶. Furthermore, social norms regarding uniform school readiness risk overlooking the developmental needs of stunted children, thereby widening the educational

²⁴ Ruswiyani, E., & Irviana, I. (2024). Peran stimulasi psikososial, faktor ibu, dan asuhan anak dalam meningkatkan perkembangan anak stunting: Tinjauan literatur. *Jurnal Parenting dan Anak*, 1(2), 1–8. <https://doi.org/10.47134/jpa.v1i2.313>

²⁵ Sari, N. P., et al. (2025). Peran strategis pendidikan anak usia dini dalam pencegahan stunting. *Integrative Perspectives of Social and Science Journal*, 2(1), 116–121. <https://ipssj.com/index.php/ojs/article/view/42>

²⁶ Lestari, T. R. P. (2025). Evaluasi kebijakan dan strategi penurunan angka stunting pada tahun 2024. *Aspirasi: Jurnal Masalah-Masalah Sosial*, 16(1), 71–86. <https://doi.org/10.46807/aspirasi.v16i1.4800>

achievement gap. Thus, the socioecological model of stunting and education (Figure 2) provides a conceptual framework that emphasizes the importance of an integrative, cross-sectoral, and cross-ecological-level approach, and serves as the foundation for developing psychoeducational interventions that are sensitive to the developmental and educational context of Indonesian children.

CONCLUSION

This review indicates that stunting is a developmental phenomenon influenced by complex interactions among various systems in a child's environment. The impact of stunting on school readiness and academic achievement cannot be separated from the context of family, school, infrastructure, and policy. Therefore, interventions to address stunting need to adopt an integrative socioecological approach that involves the education sector more actively. The proposed socioecological model can serve as a conceptual foundation for the development of psychoeducational interventions that are sensitive to the developmental context of Indonesian children. Practically, the findings highlight the importance of strengthening collaboration among families, schools, health services, and policymakers to support early identification, developmental stimulation, and educational readiness among children affected by stunting. Integrating educational and psychosocial components into existing stunting prevention programs may help reduce long-term developmental and educational disadvantages. Future research is recommended to examine the effectiveness of integrated psychoeducational interventions across different regions and educational settings in Indonesia through longitudinal and empirical studies.

REFERENCES

- Alfy, Z. R., & A'ini, Z. F. (2024). Determinan stunting di Provinsi Nusa Tenggara Timur (NTT) tahun 2022. *EduBiologia: Biological Science and Education Journal*, 4(2), 50. <https://doi.org/10.30998/edubiologia.v4i2.23905>
- Amatullah, T. A., & Indriyani, S. A. K. (2024). Literature review: Risk factors of stunting in children under five years old and how to prevent. *Jurnal Biologi Tropis*, 24(1b), 746–757. <https://doi.org/10.29303/jbt.v24i1b.7911>
- Arqam, M. L., Firdaus, A. A., Muslih, A., et al. (2025). Integrating education-based interventions and machine learning for stunting prevention: A case study in East Lombok, Indonesia. *PMC*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC12754223/>
- Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., Ezzati, M., Grantham-McGregor, S., Katz, J., Martorell, R., Uauy, R., & Maternal and Child Nutrition Study Group. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427–451. [https://doi.org/10.1016/S0140-6736\(13\)60937](https://doi.org/10.1016/S0140-6736(13)60937)
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
- Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. Dalam R. M. Lerner (Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., hlm. 793–828).

- Deda, Y. N., Nahak, M. P. M., & Pala, A. (2024). Global trend of stunting in the last decade: A bibliometric analysis. *Amerta Nutrition*, 8(4), 654–664. <https://doi.org/10.20473/amnt.v8i4.2024.654-664>
- Devi, A. C., & Nurvita, S. (2025). Analisis spasial kasus stunting di Provinsi Jawa Tengah. *Jurnal Ilmu Kedokteran dan Kesehatan*, 12(9), 1932–1939.
- Dinas Kesehatan Provinsi Papua. (2023). Laporan tahunan penanganan stunting di Provinsi Papua. Dinkes Papua.
- Gabriela, R., Giselia, A., Bruna, M., & Marilia, D. C. L. (2023). Determining factors of child linear growth from the viewpoint of Bronfenbrenner's bioecological theory. *Jornal de Pediatria*, 99(3). <https://doi.org/10.1016/j.jped.2022.10.009>
- Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26(2), 91–108. <https://doi.org/10.1111/j.1471-1842.2009.00848>
- Hapzah, H., Asmuni, A., & Nurbaya, N. (2023). Stunting itu bukan hanya pendek: Studi kualitatif persepsi ibu tentang stunting dan faktor penyebabnya. *Jurnal Kesehatan Masyarakat Indonesia*, 18(2), 28–35.
- Hidayah, N., Sari, N., Pratama, D., Wijaya, S., Nugroho, A., & Santoso, B. (2024). Stunting and its association with education and cognitive outcomes among children in Indonesia. *PLoS ONE*, 19(5), Article e0295380. <https://doi.org/10.1371/journal.pone.0295380>
- Kementerian Kesehatan Republik Indonesia. (2025). Survei Status Gizi Indonesia (SSGI) 2025. Kementerian Kesehatan RI.
- Kirana, J. S., Flora, R., & Fajar, N. A. (2025). Hubungan stunting dengan keterlambatan perkembangan bahasa pada anak usia 6–36 bulan: A systematic review. *Jurnal Kesehatan Masyarakat*, 4, 306–316.
- Lestari, T. R. P. (2025). Evaluasi kebijakan dan strategi penurunan angka stunting pada tahun 2024. *Aspirasi: Jurnal Masalah-Masalah Sosial*, 16(1), 71–86. <https://doi.org/10.46807/aspirasi.v16i1.4800>
- Mulyaningsih, T., Mohanty, I., Widyaningsih, V., Gebremedhin, T. A., Miranti, R., & Wiyono, V. H. (2021). Beyond personal factors: Multilevel determinants of childhood stunting in Indonesia. *PLoS ONE*, 16(12), Article e0260265. <https://doi.org/10.1371/journal.pone.0260265>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Riznawati, A., Yudhistira, D., & Eryando, T. (2023). Autokorelasi spasial prevalensi stunting di Jawa Barat tahun 2021. *Jurnal Biostatistik, Kependudukan, dan Informatika Kesehatan*, 3(1). <https://doi.org/10.7454/bikfokes.v3i1.1035>
- Ruswiyani, E., & Irviana, I. (2024). Peran stimulasi psikososial, faktor ibu, dan asuhan anak dalam meningkatkan perkembangan anak stunting: Tinjauan literatur. *Jurnal Parenting dan Anak*, 1(2), 1–8. <https://doi.org/10.47134/jpa.v1i2.313>
- Sari, N. P., et al. (2025). Peran strategis pendidikan anak usia dini dalam pencegahan stunting. *Integrative Perspectives of Social and Science Journal*, 2(1), 116–121. <https://ipssj.com/index.php/ojs/article/view/42>

- Sofiyulloh, S., & Rahmaniati, M. (2024). Faktor kontributor prevalensi stunting: Studi kasus Jawa Timur tahun 2022. *Jurnal Biostatistik, Kependudukan, dan Informatika Kesehatan*, 5(1). <https://doi.org/10.7454/bikfokes.v5i1.1087>
- Sumartini, E. (2020). Dampak stunting terhadap kemampuan kognitif anak: Studi literatur. Dalam *Prosiding Seminar Nasional Kesehatan: Peran Tenaga Kesehatan dalam Menurunkan Kejadian Stunting* (hlm. 127–134). STIKes Respati.