Journal Health Care and Dietetics

Volume 1 No 1 (2025): 0033-0038
E-ISSN: 0000-0000 (Online)
DOI :
Published by Media Publikasi Cendekia Indonesia
Journal homepage: https://journalmpci.com/index.php/jhcd

The Role of Maternal Nutritional Status in Preventing Stunting During the Golden Growth Period

Ida Bagus Sudana Sukabrata[1], H. Zakaria[2], Rudy Hartono[3]

Correspondence email: ibsudanasukabrata@gmail.com
[1] *Student of the Dietitian Professional Education Program at the Health Polytechnic of Makassar, Indonesia*
[2] *Lecturer of the Dietitian Professional Education Program at the Health Polytechnic of Makassar, Indonesia*
[3] *Lecturer of the Dietitian Professional Education Program at the Health Polytechnic of Makassar, Indonesia*

ABSTRACT

Stunting remains one of the major chronic nutritional problems and a persistent public health challenge in Indonesia. This condition impairs not only physical development but also cognitive abilities, future work capacity, and general life quality. Ensuring adequate maternal nutrition during pregnancy is crucial to minimizing the risk of stunting, especially during the first 1,000 days a critical period for both physical and mental development in children. Poor maternal nutrition during this window can impair fetal development and increase the risk of stunting.

The review found a strong link between poor maternal nutritional status particularly chronic energy deficiency (CED) and anemia and higher rates of stunting in children. Additional contributing factors include maternal nutrition knowledge, dietary patterns during pregnancy, and access to healthcare services. Enhancing maternal nutrition through education, nutritional interventions, and improved healthcare access is essential for effective stunting prevention. These efforts should be concentrated during pregnancy through the child's first two years, recognized as a critical window for optimal growth and development

ARTICLE INFO

SYSTEMATIC REVIEW

Submitted: 1 March, 2025
Accepted: 30 May , 2025

Keywords:
Maternal Nutrition, Preventing Stunting, Golden Growth

Key Message:

- The purpose of this study is to explore how maternal nutrition throughout pregnancy may be linked to stunting in children
- It also aims to identify key factors affecting maternal nutrient adequacy, including dietary habits, essential nutrient intake, and access to healthcare services.
- Understanding these relationships is expected to serve as a foundation for developing more targeted and effective stunting prevention strategies beginning in pregnancy

INTRODUCTION

Stunting remains a significant public health concern in Indonesia, with a national prevalence rate of 19.8%. It is marked by a child's height falling considerably below the age-appropriate standard, often due to sustained nutritional deficiencies and repeated infections in early childhood. Beyond impairing physical growth, stunting also hinders cognitive development, reduces future productivity, and elevates the likelihood of non-communicable diseases in adulthood. Children who experience stunting are more likely to have lower cognitive abilities, be more susceptible to illness, and face reduced quality of life in adulthood. On a broader scale, stunting can hinder national economic growth, exacerbate poverty, and widen social inequality (1)

The causes of stunting are multifactorial, involving both direct factors such as insufficient nutrient intake and frequent infections and indirect factors, including poor sanitation, poverty, inadequate parenting practices, and limited access to healthcare services. Preventing stunting requires focused attention during the first 1,000 days of life, as most impairments occurring in this phase cannot be reversed (2)

Maternal nutritional status during pregnancy is a key determinant of fetal growth and development, which significantly influences child health outcomes. Inadequate maternal nutrition can lead to intrauterine growth restriction, low birth weight (LBW), and a higher risk of stunting in childhood (3). Indonesia continues to face considerable challenges in improving maternal nutritional status. The prevalence of pregnant women with Chronic Energy Deficiency (CED) remains high at 16.9% (4) CED increases the likelihood of giving birth to undernourished infants, which can disrupt linear growth and eventually result in stunting. Additionally, maternal anemia is a major risk factor for LBW, further elevating the risk of stunting in early childhood.

Numerous studies highlight the critical role of maternal nutrition in determining a child's health status. Factors such as maternal dietary patterns, sufficient intake of protein, iron, and folic acid, as well as access to quality healthcare services, significantly influence fetal and infant development. Therefore, improving maternal nutritional status through education, targeted nutrition interventions, and better access to healthcare is a strategic step in stunting prevention.[5] This study aims to analyze the relationship between maternal nutritional status during pregnancy and stunting in children. It also seeks to identify the key factors that influence maternal nutrient adequacy during pregnancy. By understanding these factors, more effective strategies for early stunting prevention can be developed.

METHODS

This study employed a literature review method. The article search was conducted using the Google Scholar database with the keywords "maternal nutritional status" and "stunting." Inclusion criteria for selected articles included publication in accredited national journals, publication within the last ten years, full-text availability, open access, and no restrictions on study design. Studies were excluded if they did not address the nutritional status of pregnant women or its association with stunting The initial search yielded 62 articles. After screening based on title relevance, abstract content, and removal of duplicates, a total of 10 articles were deemed relevant and analyzed in full text.

This review focuses on several key variables: maternal nutritional status, anemia, maternal knowledge, low birth weight (LBW), and the incidence of stunting. This study employed a narrative synthesis approach, in which findings from the selected articles were integrated qualitatively. The process involved identifying, comparing, and analyzing key results, emerging themes, and patterns across the 10 selected studies. No statistical meta-analysis was conducted. The results were summarized using a matrix table (Table 1) to facilitate comparison of critical variables such as maternal nutritional status (including Chronic Energy Deficiency and anemia), Low Birth Weight (LBW), and the incidence of stunting. This study utilized a narrative sythesis method, were findings from the selected articles were qualitatively integrated. The aythesis involved comparing results, identifying thems, and analyzing patterns across the ten included studies.

A statistical meta-analysis was not performed. Instead, the findings were organized into a matrix table (table 1) to enabel comparison of key variables such as maternal nutritional status (including chronic energy dificiency and anemia), low birth weight (LBW), and the incidence of stunting.

RESULTS

Based on the article search, 10 relevant studies were identified and analyzed using a matrix table (Table 1) to map the variables studied related to maternal nutritional status and stunting. Most of the articles (5 out of 10) applied a cross-sectional study design, while the others used case-control and retrospective study designs.

DISCUSSION

Maternal nutritional status during pregnancy can be monitored through Mid-Upper Arm Circumference (MUAC) measurements. A MUAC value of less than 23.5 cm indicates a risk of Chronic Energy Deficiency (CED), which increases the likelihood of delivering a baby with low birth weight (LBW). Research shows that maternal undernutrition significantly contributes to the high prevalence of LBW. Nutritional deficiencies during the first trimester are associated with preterm birth, while deficiencies in the second and third trimesters can hinder fetal growth, resulting in low birth weight.

A review of ten scientific articles reveals that maternal nutritional status during pregnancy has a significant impact on stunting in children under five. Eight of the ten studies indicated that pregnant women with inadequate nutrition, particularly those suffering from CED, were more likely to give birth to children with height-for-age below the standard.

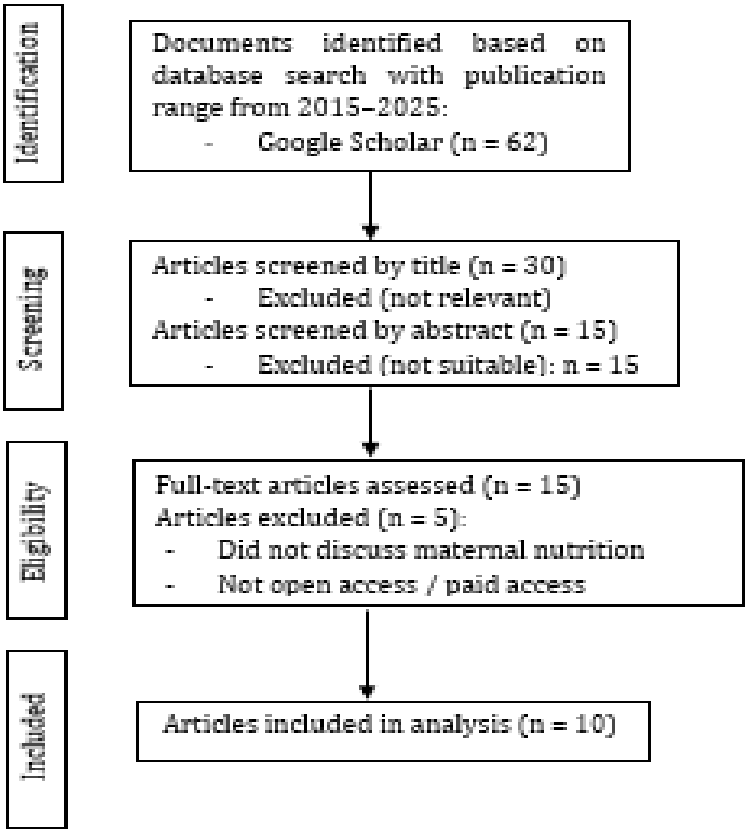

Figure 1. Article Selection Flowchart Based on PRISMA Guidelines

Tabel 1. Synthesis analysis of the literature

No	Researcher	Methods	Result
1	Dian Anisia Widyaningrum, Dhiyah Ayu Romadhoni (2018)[6]	An analytical approach using a case-control study design.	The findings indicated that in the case group, 66.7% (18 individuals) of pregnant women had a history of anemia, while 33.3% (9 individuals) did not. In comparison, within the control group, 30.9% (17 individuals) had experienced anemia during pregnancy, and 69.1% (38 individuals) had not. Chi-square analysis revealed a statistically significant correlation between maternal anemia during pregnancy and stunting in children under five, with a p-value of 0.005 (less than 0.05) and an odds ratio (OR) of 4.471. These results suggest that children born to anemic mothers are four times more likely to be stunted than those born to mothers with normal hemoglobin levels.
2	Sukmawati, Hendrayati, Chaerunnimah, Nurhumaira (2018)[7]	observational analytic study using a cross-sectional design	Based on the statistical test, the p-value was 0.01, which is lower than the significance level ($\alpha = 0.05$), indicating a significant relationship between maternal nutritional status, as measured by MUAC (Mid-Upper Arm Circumference), and the incidence of stunting.
3	Nilfar Ruaida, Octovina Soumokil (2018)[3]	observational study using a case-control	The study results showed that most pregnant women with Chronic Energy Deficiency (CED) gave birth to children who did

No	Researcher	Methods	Result
		design	not experience stunting (77.91%). Low Birth Weight (LBW) was observed in 70.00% of mothers with CED, while 71.77% of mothers without CED did not give birth to LBW infants. Stunting occurred in 64.47% of children who were not born with LBW. Conversely, stunting did not occur in 98.16% of children who had no history of LBW.
4	Ringgo Alfarisi, Yesi Nurmalasari, Syifa Nabilla (2019)[8]	observational analytic study using a cross-sectional design	Univariate analysis indicated that 64.1% of mothers had a normal nutritional status, and 59.5% of children under five were not stunted. The bivariate analysis demonstrated a statistically significant association between maternal nutritional status during pregnancy and stunting among children aged 6 to 59 months (p = 0.005). Conclusion: There is a significant correlation between maternal nutrition during pregnancy and stunting in children aged 6–59 months.
5	Hemi Fitriani, Achmad Setya R, Popy Nurdiana (2020)[9]	Restrospective design	Evidence suggests a strong relationship between inadequate prenatal nutrition and stunted growth in children. Children of undernourished mothers tend to be at greater risk of impaired linear growth.
6	Rikayoni, Dian Rahmi (2022)[10]	correlational analytic study using a retrospective cohort design	The analysis revealed no substantial correlation between prenatal maternal nutrition and the occurrence of stunting in children under three years old.
7	Ni Nyoman Widya Pradani, dr. Noviana Indarti (2022)[11]	quantitative study with a correlational analytic design and a cross-sectional approach	The majority of respondents had normal nutritional status during pregnancy, totaling 19 individuals (51.4%). Most children aged 2–3 years were classified as short, with 30 respondents (81.1%) falling into this category. The analysis revealed a significant association (p = 0.042) between the nutritional status of pregnant mothers and the occurrence of stunting in their children aged 2–3 years. Conclusion: Nutritional status during pregnancy has a significant effect on stunting among children aged 2 to 3 years.
8	Putu Cindy Anitya, Asep Arifin Senjaya, Ni Ketut Somoyani (2022)[12]	observational analytic study using a cross-sectional design.	The proportion of pregnant women with a Mid-Upper Arm Circumference (MUAC) ≥ 23.5 cm was 70.3%, while those with hemoglobin (Hb) levels ≥ 11 g/dL accounted for 89.7%. The prevalence of stunting among children in 2022 was 20.7%. The study reported a significant correlation (p = 0.018) between the nutritional status of pregnant women and the incidence of stunting in children in the area served by UPT Puskesmas Kintamani VI.
9	Reni Diana, Besti Verawati, Eka Roshifita Rizqi (2023)[13]	quantitative study using a case-control design	Based on the study results, most respondents had a nutritional status indicating no Chronic Energy Deficiency (CED). In the case group (n = 30), 12 respondents (40%) had stunted children despite the mothers not having CED. In the control group (n = 30), 25 respondents (83.3%) had mothers with no CED. There was a significant association between maternal nutritional status during pregnancy and the incidence of stunting, with a p-value of 0.010.

No	Researcher	Methods	Result
10	Muhammad Abi Nubli, Sutarto (2023)[14]	observational study using a case-control design	The study results showed that 32 mothers (30.8%) had a history of Chronic Energy Deficiency (CED) during pregnancy, while 72 mothers (69.2%) did not. Maternal CED during pregnancy was identified as a risk factor for stunting among children aged 24–59 months in the working area of Way Urang Health Center, South Lampung Regency.

For instance, a study by Widyaningrum and Romadhoni (2018) found that mothers with anemia during pregnancy were four times more likely to have stunted children compared to mothers with normal hemoglobin levels ($p = 0.005$; OR = 4.471). Similarly, Pradani and Indarti (2022) reported a strong association between maternal nutrition and child height at ages 2–3, where most children of well-nourished mothers did not experience stunting ($p = 0.042$). Supporting this, Fitriani et al. (2020) found in their study in Cimahi that children born to undernourished mothers were over 13 times more likely to be stunted (OR = 13.222; $p = 0.000$), emphasizing the critical role of adequate maternal nutrition from early pregnancy.

Ruaida and Soumokil (2018) also demonstrated a strong link between CED and low birth weight, which in turn contributes to poor child growth and an increased risk of stunting. Another study by Sukmawati et al. (2018) concluded that low MUAC and LBW were significantly associated with stunting in children aged 6–36 months.

In Pekanbaru, Reni Diana et al. (2023) found that non-CED mothers were more likely to have children who were not stunted ($p = 0.010$). Meanwhile, in Bali, Anitya et al. (2023) discovered that mothers with MUAC <23.5 cm or hemoglobin <11 g/dL were at higher risk of having stunted children, with statistically significant results ($p = 0.018$). Similarly, Alfarisi et al. (2019) reported that most non-stunted children were born to mothers with adequate nutritional status. Interestingly, a study by Rikayoni and Rahmi (2023) in Sijunjung reported no significant association between maternal nutritional status and stunting in children aged 0–36 months. The lack of association in this case may be attributed to other influencing factors such as environmental conditions, parenting practices, and sanitation.

On the other hand, a study by Abi Nubli and Sutarto (2023) confirmed that pregnant women with CED had a higher risk of having stunted children aged 24–59 months. Their findings identified maternal CED as a major risk factor requiring early intervention during pregnancy. Collectively, these findings underscore the importance of improving maternal nutrition before and during pregnancy. Monitoring MUAC, body weight, hemoglobin levels, providing nutrition education, and supplementing with additional food are critical strategies to prevent stunting. These findings support government efforts to reduce stunting through maternal nutrition interventions during the first 1,000 days of life.

A mother's nutritional history, including CED and iron-deficiency anemia (15)(16)(17), also contributes to the risk of stunting. CED increases the likelihood of giving birth to malnourished infants, while iron-deficiency anemia can impair fetal development and elevate the risk of stunting. Infants born to anemic mothers have up to four times the risk of being stunted. Thus, anemia during pregnancy is indirectly linked to maternal nutritional status and plays a critical role in stunting outcomes.(18)(19)(20).

The findings of this study underscore the critical role maternal nutrition plays in shaping child health outcomes, particularly in preventing stunting during the golden growth period. From a public health perspective, this highlights the urgent need for comprehensive maternal nutrition programs, including education, supplementation, and improved access to prenatal care services. Prioritizing maternal nutritional status during pregnancy and the first two years of a child's life can significantly reduce stunting rates, improve cognitive development, and promote long-term societal and economic well-being. Consequently, these results advocate for maternal nutrition to be positioned as a central component of national stunting prevention strategies

CONCLUSION

Maternal nutritional status is a critical factor in stunting prevention. Pregnant women with a Mid-Upper Arm Circumference (MUAC) below 23.5 cm are at risk of Chronic Energy Deficiency (CED), which may lead to Low Birth Weight (LBW) and increase the likelihood of stunting in their children. LBW infants are at greater risk of experiencing impaired physical growth and long-term cognitive development delays. Anemia during pregnancy particularly iron-deficiency anemia further exacerbates the risk of stunting, as it compromises the nutrient supply to the fetus. Infants born to anemic mothers are up to four times more likely to be stunted. Stunting prevention interventions should begin as early as pregnancy, with close monitoring of maternal nutritional indicators such as MUAC and hemoglobin levels, improved intake of key nutrients (protein, iron, folic acid), nutritional education, and adequate access to healthcare services. The first 1,000 days, from

conception to a child's second birthday, are a critical period for growth. Without timely intervention, stunting that occurs during this phase may have irreversible effects. Further investigation is required to assess the impact of community-based, evidence-guided strategies to prevent stunting early in life.

Funding : This study was self-funded and did not receive any external financial support
Acknowledgments : This author would like to express sincere gratitude to the supervisors and reviewers for their valuable contributions, which enabled the publication of this study.
Conflict of interest: The author reports no conflicts of interest associated with this research

REFERENCES

1. Kemenkes B. Survey Kesehatan Indonesia (SKI) Dalam Angka Data Akurat Kebijakan Tepat. Vol 01. Kemenkes RI; 2023. https://www.badankebijakan.kemkes.go.id/ski-2023-dalam-angka/
2. Djauhari T. Gizi Dan 1. Djauhari T. Gizi Dan 1000 Hpk. Saintika Med. 2017;13(2):125. 1000 Hpk. Saintika Med. 2017;13(2):129.
3. Ruaida N, Soumokil O. Hubungan Status KEK Ibu Hamil Dan BBLR Dengan Kejadian Stunting Pada Balita Di PUSKESMAS Tawiri Kota Ambon. J Kesehat Terpadu (Integrated Heal Journal). 2018;9(2):1-7. doi:10.32695/jkt.v2i9.12
4. Kementerian Kesehatan Republik Indonesia. Survei Status Gizi Indonesia 2022.; 2023. https://gizi.kemkes.go.id
5. Pristya TYR, Fitri AM, Wahyuningtyas W. Literature Review: Gizi Antenatal terhadap Kejadian Stunting. J Kesehat. 2021;12(2):314-321. doi:10.26630/jk.v12i2.2261
6. Widyaningrum D, Romadhoni D. Riwayat anemia kehamilan dengan kejadian stunting pada balita di Desa Ketandan Dagangan Madiun. Medica Majapahit. 2018;10(2):90-94. http://ejournal.stikesmajapahit.ac.id/index.php/MM/article/view/291
7. Sukmawati, Hendrayati, Chaerunimah, Nurhumairah. Keterkaitan status gizi ibu hamil serta BBLR dengan stunting pada anak. Media Gizi Pangan. 2018;25:18-24.
8. Alfarisi R, Nurmalasari Y, Nabilla S. Status Gizi Ibu Hamil Dapat Menyebabkan Kejadian Stunting Pada Balita. 5, 271-278 (2019).
9. Fitriani H, Achmad Setya R, Nurdiana P. Risk Factors of Maternal Nutrition Status During Pregnancy to Stunting in Toddlers Aged 12-59 Months. J Keperawatan Padjadjaran. 2020;8(2):174-182. doi:10.24198/jkp.v8i2.1305
10. Rahmi D, Keperawatan Baiturrahmah Padang A, Raya By Pass JK, Pacah Padang A. Hubungan Status Gizi Ibu Selama Hamil Dengan Kejadian Stunting Pada Bayi Usia 0-36 Bulan Di Wilayah Kerja PUSKESMAS Sijunjung Tahun 2022 (Relationship Between Nutritional Status Of Mothers During Pregnancy With Stunting Incidence Babies Aged 0-36 Month In Public Health Center Work Area Sijunjung 2022). 01(2023).
11. Pradani NNW, Indarti N. Hubungan Status Gizi Ibu hamil Dengan Kejadian Stunting Di Puskesmas Teritip Balikpapan. Junal kebidanan. 2022;XIV(02):224-233. www.ejurnal.stikeseub.ac.id
12. Anitya PC, Senjaya AA, Somoyani NK. Hubungan Status Gizi Ibu Saat Hamil dengan Kejadian Stunting di Wilayah Kerja Unit Pelaksana Teknis Puskesmas Kintamani VI Tahun 2022. J Ilm Kebidanan (The J Midwifery). 2023;11(1):1-8. doi:10.33992/jik.v11i1.2075
13. Diana R, Verawati B, Rizqi ER. Hubungan Status Gizi Ibu Saat Hamil Dengan Kejadian Stunting Pada Balita Usia 24-59 Bulan Di Wilayah Kerja PUSKESMAS Rejosari Kota Pekanbaru. 2, 2774-5848 (2024).
14. Abi Nubli M, Sutarto. Kurang Energi Kronis Ibu Hamil sebagai Faktor Risiko Terhadap Kejadian Stunting Pada Balita (Usia 24-59 Bulan). Medula. 2023;13(6):1036-1045.
15. Camaschella C. New insights into iron deficiency and iron deficiency anemia. Blood reviews. 2017 Jul 1;31(4):225-33.
16. Cantor AG, Holmes R, Bougatsos C, Atchison C, DeLoughery T, Chou R. Screening and supplementation for iron deficiency and iron deficiency anemia during pregnancy: updated evidence report and systematic review for the US Preventive Services Task Force. Jama. 2024 Sep 17;332(11):914-28.
17. Leung AK, Lam JM, Wong AH, Hon KL, Li X. Iron deficiency anemia: an updated review. Current pediatric reviews. 2024 Aug 1;20(3):339-56.
18. Oktarina C, Dilantika C, Sitorus NL, Basrowi RW. Relationship between iron deficiency anemia and stunting in pediatric populations in developing countries: a systematic review and meta-analysis. Children. 2024 Oct 19;11(10):1268.
19. Salsabila AN, Widjaja NA, Notopuro PB. Hemoglobin and Ferritin Levels as Indicators of Chronic Infection in Stunting Children: A Comprehensive Literature Review. International Journal Of Scientific Advances. 2024;5(6).
20. Sitompul DR, Martini M. Stunting Acceleration Program By Using Approach To Optimizing The Health Of Teenage Girls Who Is Free From Iron Deficiency Anemia In The City Of Banjarmasin. GemassikA: Jurnal Pengabdian Kepada Masyarakat. 2025 May 28;9(1):17-23.