



Maternal Factors as Determinants of Stunting in Children Under Five Years Old: A Systematic Review

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Article Info	Abstrak
Article History: Submitted 2025-06-10 Revised 2025-06-20 Accepted 2025-06-22	Stunting masih menjadi satu diantara masalah kesehatan masyarakat yang serius khususnya di negara berkembang seperti Indonesia. Kejadian stunting pada balita bersifat multifaktorial, salah satunya diduga disebabkan karena faktor maternal. Penelitian ini bertujuan untuk mengeksplorasi penelitian-penelitian terdahulu yang relevan dalam mengidentifikasi faktor maternal terhadap kejadian stunting pada balita di Indonesia. Penelitian ini merupakan systematic review yang disusun berdasarkan metode PRISMA flowchart sebagai panduan. Tiga database elektronik yang digunakan dalam pencarian literatur yakni: Portal Garuda, Pubmed dan Science Direct. Artikel dipilih berdasarkan terbitan 3 tahun terakhir mulai dari tahun 2022-2025. Terdapat 12 artikel yang dinyatakan layak untuk dianalisis dari total 2.042 publikasi yang diidentifikasi melalui tiga database online. Hasil analisis menunjukkan karakteristik ibu (usia, pendidikan, pendapatan, tinggi badan, status gizi, paritas, dan jarak kelahiran), kondisi kesehatan ibu selama hamil (pertambahan berat badan, penyakit infeksi, riwayat anemia, dan kekurangan energi kronik), and pola asuh ibu terkait pemenuhan gizi (pemberian ASI eksklusif dan praktik pemberian makan) berperan secara signifikan dengan kejadian stunting pada balita di Indonesia.
Kata Kunci: : Balita, Maternal, Stunting	
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Abstract

Stunting remains a pervasive public health concern, particularly in developing countries such as Indonesia. The etiology of stunting in toddlers is multifactorial, with one potential causative factor being maternal. The objective of this study is to examine extant studies that are pertinent in identifying maternal factors for the incidence of stunting in toddlers in Indonesia. The present study is a systematic review, meticulously organized according to the PRISMA flowchart method. A comprehensive literature search was conducted using three major electronic databases: Garuda Portal, Pubmed, and Science Direct. The selection of articles was based on the most recent three years of publications, commencing from 2022 to 2025. A total of 2,042 publications were identified through three online databases, and 12 articles were deemed eligible for analysis. The results of the analysis demonstrated that maternal characteristics (i.e., age, education, income, height, nutritional status, parity, and birth spacing) and maternal health conditions during pregnancy (i.e., weight gain, infectious diseases, history of anemia, and chronic energy deficiency) were significantly associated with the incidence of stunting in children under five in Indonesia. Additionally, maternal parenting related to nutrition fulfillment (i.e., exclusive breastfeeding and feeding practices) was associated with the incidence of stunting in children under five in Indonesia.

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INTRODUCTION

Stunting remains a significant public health concern, particularly in developing countries such as Indonesia. Globally, an estimated 149 million preschool children aged up to five years old are stunted. According to the World Health Organization (WHO) (2019), the prevalence of stunted toddlers in Indonesia is included in the third country with the highest prevalence in the Southeast Asian region (Mediani et al., 2023; Silva et al., 2023). The Indonesian Nutrition Status Survey (SSGI) documented a decline in the prevalence of stunting in Indonesia, from 24.4% in 2021 to 19.8% in 2024. However, this figure remains a concern because it has not yet reached the 2024 national target of 14%. The issue of stunting in Indonesia has been likened to unresolved homework. Indeed, initiatives aimed at mitigating stunting are incorporated within the framework of the National Medium-Term Development Plan (RPJMN). According to the findings of UNICEF's nutrition study, the prevalence of stunting in Indonesia is a matter of significant concern (BAPPENAS, 2022).

The occurrence of stunting is indicative of the prevalence of growth disorders in the pre- and postnatal periods, attributable to inadequate nutritional and health status. Stunting is not the result of a single factor, but rather, it is the consequence of a series of interconnected multifactors. According to the 2013 childhood stunting conceptual framework of the World Health Organization (WHO), the etiology of stunting is multifactorial, with maternal factors representing one such domain (Wardani, 2022). It is widely acknowledged that mothers play a pivotal role in the prevention of child stunting, particularly during the "golden phase" of

growth. This prevention strategy is predicated on three fundamental stages: preconception, prenatal (during pregnancy), and infancy. It is imperative to acknowledge the significance of health conditions in the preconception phase, as they play a pivotal role in preparing the mother's body to support healthy fetal development. Problems that occur at this stage can disrupt fetal growth and increase the risk of stunting in children. In summary, the maintenance of optimal health during these three phases is paramount to ensure optimal child development and prevent stunting (Safutri, 2024).

The period of early childhood, particularly that of toddlerhood, is characterized by accelerated cell growth and development. During this period, compromised child health can potentially impede future growth and development. Stunting in young children has been demonstrated to engender a series of deleterious long-term effects, including an increased susceptibility to disease, elevated mortality rates, suboptimal physical growth, and impaired mental, cognitive, and motor development (Laili, 2019). This condition is characterized by its irreversible nature, which invariably gives rise to repercussions that extend to future developmental trajectories. The consequences of chronic malnutrition, which often results in short stature, manifest in stunted mental development, diminished academic performance, and impaired intellectual ability. These factors can adversely impact an individual's productivity levels in adulthood (Olo et al., 2021). Consequently, the primary objective should be to identify and mitigate the risk factors associated with stunting, with the aim of preventing its occurrence at the earliest stages of life. The objective of this study is to examine extant

research that is pertinent in identifying maternal factors associated with the prevalence of stunting in children under five in Indonesia.

METHOD

The present study is a systematic review that has been organized according to the PRISMA flowchart method as a guide. A comprehensive literature search was conducted using three major electronic databases: Garuda Portal, Pubmed, and Science Direct. In the context of the article search process, the Boolean operator "AND" was employed to combine keywords, such as "characteristic" OR "characteristics" AND "maternal" OR "mother" AND "stunting." In consideration of the necessity to update information, present the most recent data and evidence relevant to current conditions, the articles selected were those published from January 2022 to May 2025. In light of the aforementioned considerations, the results of the literature search yielded 2,042 articles, with the following details:

Table 1. Literature Search

Database	Result
Garuda	63 article
Google Scholar	1.660 article
Pubmed	319 article

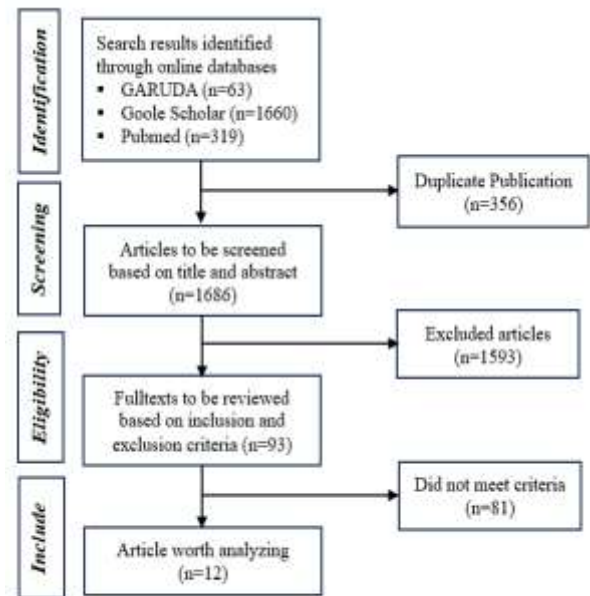


Figure 1. Prisma Flow Diagram

The subsequent duplication check revealed 356 articles with significant similarities, and subsequent deletions reduced the total to 1,686. Subsequently, the articles were subjected to an eligibility assessment. Those articles that did not align with the specified research topic and lacked a full text were excluded from the study. Subsequently, a comprehensive evaluation was undertaken, with reference to the established inclusion and exclusion criteria. In order to participate in this study, subjects must meet the following inclusion criteria: 1) Research must be original and written in either Indonesian or English; 2) Research must be conducted on children aged less than five years. The purpose of the study must be to determine the characteristics of mothers with the incidence of stunting in children. The exclusion criteria are as follows: 1) studies lacking open access fulltext; 2) studies of the SR and MA research types; and 3) studies that do not provide results and explanations according to the research topic. The results of the assessment yielded 11 articles that were in accordance with the research topic.

The final step in the process entailed a meticulous review of each article. Two individuals (EPR and APR) will methodically select and extract data from the articles independently using standardized instruments. The JBI Critical Appraisal Checklist was employed as the instrument to assess the quality of the selected articles. Articles that received a minimum score of 50% in the quality assessment were selected for further analysis, in accordance with the standardized cut-off points established for critical appraisal. The research team meticulously reviewed and resolved any discrepancies pertaining to the eligibility of articles. A thorough evaluation of the eight articles reveals that none of them were excluded on the basis that they met the requirements of the assessment instrument.

Consequently, all of the subjects met the criteria for further analysis through data synthesis.

RESULT AND DISCUSSION

A total of 2,042 publications were identified through a comprehensive search of three major online databases: the GARUDA portal, Google Scholar, and Pubmed. After a thorough review, 356 of these publications were deemed duplicates, 1,593 were extracted based on their titles and abstracts, and 81 articles did not meet the stringent inclusion and exclusion standards established for this study. Consequently, a total of 12 articles were deemed eligible for further analysis. The results of the article analysis conducted in this study are presented in the following table.

Table 2. The following section presents the results of the article analysis conducted in the study.

Title	Author, Location, and Year of Publication	Purpose	Design and dan Sample	Results
Effect of Maternal and Child Factors on Stunting: Partial Least Squares Structural Equation Modelling	Authors: Agus Santosa, Essa Novanda Arif, and Dinal Abdul Ghoni Location: The Purbalingga Regency is located within the Central Java Province. The year of publication is 2022.	This study analyzed the effect of maternal and child factors on stunting and the significant indicators that shape the maternal and child factors that impact stunting.	His was a case-control study. Overall, 132 stunted children and 132 nonstunted children in Purbalingga Regency, Central Java Province, participated in the research.	Indicators which contributed a significant effect on maternal factors on stunting were birth spacing, nutritional status, weight gain during pregnancy, and infectious disease during pregnancy (outer weights>0.20, t>1.96, P<0.05).
Maternal Parenting and Stunting Incidence in the Work Area of Tetaf Health Center	Authors: Maria M. R. Nele, Daniela L.A. Boeky, and Marselinus Laga Nur. Location: The public health center is located in the district of Timor Tengah Barat, in the province of Timor Tengah Barat. The year of Publication is 2024.	This study aims to determine the relationship between maternal parenting and the stunting incidence in the working area of the Tetaf Public Health Center, South Central Timor District.	The type of research was an analytic survey with a case control design. The sample in this study was 64 respondents of mothers with toddlers who were divided into a control group of 32 respondents and a case group of 32 respondents.	The results of the research showed that there was a relationship between feeding practices (OR=18.455: 95%CL=4.575-74.439: p=0.000<0.05) with stunting

Title	Author, Location, and Year of Publication	Purpose	Design and dan Sample	Results
Influence of Parenting Patterns and Maternal Characteristics on Stunting in the Working Area of Pintu Padang Health Center, South Tapanuli Regency	Authors: Nurani Harahap, Rusdiyah Sudirman Made Ali, Anto J. Hadi Location: RSUD dr. Zainoel Abidin Banda Aceh The year of Publication is 2024.	This study looks at how parenting styles and maternal qualities affect the rate of stunting in the Pintu Padang Health Center area in South Tapanuli Regency.	This type of research uses a cross-sectional study design. The research group included 182 toddlers. These toddlers were chosen at random from a larger group.	The study found that a mother's age ($p=0.000$), height ($p=0.000$), and feeding patterns ($p=0.000$) were all factors that influenced the likelihood of stunting.
Maternal Characteristics with the Incidence of Stunting	Authors: Enny Fitriahadi, Farida Arintasari, Yunri Merida Location: wilayah binaan Puskesmas Minggir The year of Publication is 2023.	To determine the characteristics of mothers with the incidence of stunting	This study used a cross-sectional method. The study included 80 mothers and their children in the Minggir Health Center's target area.	The results of the study showed that exclusive breastfeeding was associated with a lower risk of stunting.
Characteristics of Families at Risk of Stunting in Children 7-24 Months of Age	Authors: Wasilah Khoirun Nisa, Muhammad Azinar Location: Kelurahan Tanjung Mas, Bandarharjo, Kuningan, dan Dadapsari. The year of Publication is 2024	This study aims to determine the relationship between family characteristics and the risk of stunting in children aged 7-24 months in Tanjung Mas, Bandarharjo, Kuningan, and Dadapsari Villages.	This research is observational and analytic, with a design that compares cases and controls. The study looked at 175 children. 50 of them were part of the group that was studied, and 125 were part of the group that was used as a comparison.	Bivariate analysis showed that maternal age was associated with a risk of stunting ($p=0.001$; $OR=4.792$).
The Relationship between Maternal Characteristics and the Incidence of Stunting in Toddlers in the Sangkali Health Center Working Area, Tasikmalaya City	Authors: Andy Muharry, Nissa Noor Annashr, Neni, Dadan Yogaswara Location: Wilayah Kerja Puskesmas Sangkali Kota Tasikmalaya The year of Publication is 2024.	The purpose of this study was to analyze the relationship between maternal characteristics and the incidence of stunting in toddlers.	The study used a special design called a case-control study design. The sample included 50 people, who were divided into two groups: a "case" group and a "control" group. The two groups were split at a ratio of 1:2.	The findings of the multivariate analysis indicated that the variable exerting the most significant influence on the occurrence of stunting was maternal age, with a p-value of 0.013 and an odds ratio of 3.321.
Correlation Study of Characteristics and Nutritional Status of Pregnant Women on the Prevalence of	Authors: Enik Purwo Rahayu, Pintam Ayu Yastirin, Sehmawati Location: In the working area of the Panggungharjo Health Center.	To analyze the relationship between the health history of pregnant women and the incidence of stunting in the working area of	The research design used is quantitative research using analytic survey methods with a cohort approach. The population is 3140 and the sample is 355 respondents	There was a relationship between education and parity with the incidence of stunting, namely the p value Mother's education is 0.00 and the p value for mother's parity is

Title	Author, Location, and Year of Publication	Purpose	Design and dan Sample	Results
Stunting in Toddlers	The year of Publication is 2023.	the Responsibility of Health Center.		0.000. There is a relationship between maternal health history and the incidence of stunting. negative indicates that the better the mother's nutrition and the higher the mother's Hb, the lower the incidence
Relationship between maternal characteristics and the incidence of stunting in children aged 24-59 months	Authors: Esti Rahayu Location: In the Sukaraja Nuban Health Center Working Area The year of Publication is 2022.	To determine the factors related to the incidence of stunting in toddlers aged 24-59 months in the Sukaraja Nuban Health Center Working Area in 2021.	This study was an analytical observational study with a case-control design. The sampling technique was simple random sampling and obtained a sample of 60 cases and 60 controls	Variables related to stunting were maternal height ($p=0.031$, $OR=2.626$) and mother's education ($p=0.019$, $OR= 2.833$).
Risk Factors of Maternal Characteristics with the Incidence of Stunting in the Limboto Barat Health Center Working Area	Authors: Andi Aktifa Sudirman, Harismayanti, Indriani Mohamad Location: Wilayah Kerja Puskesmas Limboto Barat The year of Publication is 2023.	The objective of the present study was to ascertain the risk factors associated with maternal characteristics and the incidence of stunting in the Limboto Barat Health Center Working Area.	The research design employed is a case-control study with a retrospective approach. The sample population was determined to be 76 individuals, as determined by the application of an accidental sampling technique.	The results obtained from this study indicate a correlation between various risk factors and the incidence of stunting in the West Limboto Health Center Working Area. These risk factors include maternal age (p -value 0.018, $OR = 0.279$), maternal height (p -value 0.005, $OR = 0.219$), and a history of anemia during pregnancy (p -value 0.030, $OR = 0.297$).
Family Characteristics and Parenting Practices with the Incidence of Stunting	Authors: Intan Diah Pramithasari, Andin Sefrina Location: Puskesmas Sampang The year of Publication is 2022.	This study aims to determine the relationship between family characteristics and parenting patterns on the incidence of stunting.	The present study employed an analytic observational research design, utilizing a cross-sectional approach. This sampling was conducted inadvertently on 43 mothers of toddlers who visited health checks for toddlers at the Sampang Health Center.	A significant relationship was identified between maternal education level (p -value 0.035) and feeding practices (p -value 0.044) with the incidence of stunting in toddlers in the Sampang Health Center working area.
The Relationship Between Maternal Characteristics and the Incidence	Authors: Fia Dewi Auliani, Fauziah Hayati, Muhammad Keny Rivaldy	This study aims to determine the relationship between maternal characteristics	This study employed a descriptive correlative approach with a cross-sectional design. The total	The results of the study indicate a significant relationship between maternal education, maternal height, and

Title	Author, Location, and Year of Publication	Purpose	Design and dan Sample	Results
of Stunting in Toddlers (24-59 Months) at the Kuta Baro Health Center, Aceh Besar Regency in 2021	Location: Puskesmas Kuta Baro Kabupaten Aceh Besar tahun 2021 The year of Publication is 2022.	and the incidence of stunting in toddlers.	number of respondents included in this study was 74, who were selected through the implementation of a simple random sampling technique.	exclusive breastfeeding with the incidence of stunting in toddlers (24–59 months) at Puskesmas Kuta Baro Aceh Besar.
The Relationship between Characteristics and Maternal Knowledge of Nutrition with the Incidence of Stunting in Toddlers Aged 12-59 Months at Uptd.Puskesmas Nusa Penida I	Authors: Yuke Dwijayanti, Ni Made Nurtini, Ni Wayan Erviana Puspita Dewi Location: UPTD. Puskesmas Nusa Penida I The year of Publication is 2024.	To identify the correlation between characteristics and mothers' knowledge about nutrition and stunting incidence on toddlers aged 12-59 months in the working area of Public Health Center I Nusa Penida.	This study employed analytical quantitative design with cross sectional approach. The sample of this study was 312 mothers which were chosen by using probability sampling technique.	Based on statistical test with chi square test showed that there was significant correlation between mothers' age ($p < 0,001$) and income ($p = 0,000$) toward stunting incidence on toddlers aged 12-59 months

As demonstrated in table 2, the 12 articles under review included six research articles employing a cross-sectional study design (Auliani et al., 2023; Dwijayanti et al., 2024; Fitriahadi et al., 2023; Harahap et al., 2023; Pramithasari & Sefrina, 2022), five articles using case control study (Muharry et al., 2024; Nele et al., 2024; Nisa & Azinar, 2024; E. Rahayu, 2022; Santosa et al., 2022; Sudirman et al., 2023), and one research article using a cohort study (E. P. Rahayu & Yastirin, 2023). The results of the review indicate that maternal factors, including maternal characteristics, maternal health status during pregnancy, and maternal behavior in nutritional intake, are associated with the occurrence of stunting in toddlers in Indonesia.

A total of nine articles (Auliani et al., 2023; Dwijayanti et al., 2024; Harahap et al., 2023; Muharry et al., 2024; Nisa & Azinar, 2024; Pramithasari & Sefrina, 2022; E. Rahayu, 2022; Santosa et al., 2022; Sudirman et al., 2023) state that maternal

characteristics such as age, education, income, height, nutritional status, parity, and birth spacing affect the incidence of stunting in toddlers. A woman who becomes pregnant at an adolescent age (<20 years) will receive less early prenatal care, which is predicted to result in babies being born with low birth weight (LBW). It is estimated that infants with LBW will account for approximately 20% of the incidence of stunting (Nurhidayati et al., 2020). The occurrence of low birth weight (LBW) in adolescents is frequently linked to intrauterine growth restriction (IUGR), which is characterized by the immaturity of reproductive organs during pregnancy (Pusmaika et al., 2022).

Maternal education emerges as a significant factor, along with maternal age, in determining the prevalence of stunting. Mothers who have received a higher level of education appear to have a more profound comprehension of nutritional information and demonstrate superior

capabilities in the management of family diets. Consequently, these mothers are better equipped to ensure the nutritional needs of their families are met, thereby mitigating the risk of stunting (Marlani et al., 2021; Shodikin et al., 2023). Furthermore, inadequate maternal education has been demonstrated to exert an influence on parenting patterns in childcare, manifesting in the selection and provision of sustenance for their offspring. The provision of adequate ingredients and menus for toddlers, aimed at enhancing their nutritional status, is contingent upon the possession of a substantial degree of nutritional knowledge by mothers (Anjani et al., 2024). In addition to age and education, a low income has been demonstrated to increase the risk of stunting due to its correlation with inadequate family nutrition for both the mother and child. Prolonged inadequacies in the intake of essential nutrients, including macro- and micronutrients, have been demonstrated to result in maternal malnutrition and stunted growth in children. Limited financial resources further impede access to essential nutrients, thereby amplifying the risk of malnutrition among both mothers and children (Lestari et al., 2022; Wati & Ichsan, 2024).

Moreover, other maternal characteristics that have been demonstrated to affect the incidence of stunting include parity and birth spacing. Parity, defined as the number of children born to mothers, has been demonstrated to influence the nutritional status of toddlers, particularly in contexts where there is a high birth rate and adequate nutrition is lacking. In such circumstances, the presence of numerous children in close proximity to one another can impede the provision of balanced nutritional foods, which is a crucial aspect

of ensuring the optimal growth and development of toddlers. This phenomenon, known as stunting, underscores the need for effective nutritional interventions and policies to address the interplay between population density and child nutrition (Anatarias et al., 2024). Parity is also considered to be an indirect factor in stunting, given its close association with parenting and meeting children's nutritional needs, particularly in contexts where economic conditions are limited. Offspring of mothers with elevated parity levels are predisposed to suboptimal parenting practices and deficient nutritional intake during the developmental phase (Apriasih, 2021).

In addition to maternal characteristics, three articles (E. P. Rahayu & Yastirin, 2023; Santosa et al., 2022; Sudirman et al., 2023) stated that maternal health status during pregnancy, including weight gain, infectious diseases, a history of anemia, and chronic energy deficiency in pregnancy, affects the incidence of stunting in toddlers. The weight gain indicator during pregnancy was significant in forming maternal factors that cause stunting. It is imperative for pregnant women to closely monitor their weight gain during pregnancy, as this can have a significant impact on the development of the fetus. It has been demonstrated that if the mother experiences an abnormal weight gain during pregnancy, it will have a detrimental effect on fetal development (Pertiwi et al., 2025). In addition to weight gain during pregnancy, indicators of infectious diseases during pregnancy are also important in forming maternal factors that cause stunting. The frequency of infection during pregnancy is one of the main determinants of child growth in the first 2 years. Intrauterine infections caused

by bacteria, viruses, and parasites will affect fetal development, including premature birth and low birth weight and ultimately affect the incidence of stunting (Santosa et al., 2022).

Anemia in pregnant women has been demonstrated to inhibit fetal growth. It has been demonstrated that elevated or diminished hemoglobin (HB) levels during pregnancy exert an influence on the birth weight of the infant. Anemia can lead to stunted fetal growth or disruption of development in the womb. It has been demonstrated that anemia and chronic energy deficiency (CED) in pregnant women are associated with an increased risk of stunting (Sudirman et al., 2023). Mothers experiencing chronic energy deficiency are incapable of meeting the nutritional needs of the fetus in utero and during the early stages of life. This condition elicits a regulatory response in the fetus, manifesting as a deceleration in growth rate and a reduction in the proliferation and differentiation of human cells, including those that contribute to the development of the brain and other organs (Rahayu, 2021).

Moreover, five articles (Auliani et al., 2023; Fitriahadi et al., 2023; Harahap et al., 2023; Nele et al., 2024; Pramithasari & Sefrina, 2022) indicated that maternal behaviors, including exclusive breastfeeding practices and feeding patterns, were associated with the prevalence of stunting. Breast milk, a natural food, is characterized by its practicality, economy, and ease of digestion. Its nutritional composition is well-suited for infants, promoting growth, particularly height, due to the enhanced absorption of calcium from breast milk compared to formula milk. Breast milk is widely regarded as the optimal sustenance for infants, as it is rich in all the essential

nutrients that infants require for growth and development (Fitriahadi et al., 2023). A number of factors have been identified as contributing to the under-nutrition of infants, specifically a lack of lactation preparation during pregnancy, which can result in insufficient milk production. Consequently, some mothers do not provide exclusive breastfeeding. Indeed, adequate preparation for lactation is of paramount importance for the success of breastfeeding in which formula is not used concomitantly (Auliani et al., 2023). In addition to exclusive breastfeeding, feeding practices have been demonstrated to affect the incidence of stunting. Specifically, improper feeding practices, such as initiating complementary feeding too early, lack of meal frequency, or lack of food diversity, have been shown to cause toddlers to not get a balanced nutritional intake. This can lead to an accumulation of these substances, which can have a deleterious effect on the growth of toddlers, potentially resulting in stunting. It is imperative to recognize the pivotal role of adequate energy and protein intake in facilitating optimal growth and development in children under the age of five (Nele et al., 2024).

CONCLUSION

Based on the results of the review, it can be concluded that maternal factors such as maternal characteristics (age, education, income, height, nutritional status, parity, and birth spacing), maternal health status during pregnancy (weight gain, infectious diseases, history of anemia, and chronic energy deficiency in pregnancy), and maternal behavior (exclusive breastfeeding practices and feeding practices) play a role in the incidence of stunting in children under five in Indonesia.

Based on these findings, program or policy makers can design holistic interventions since pre-pregnancy with the main focus on ensuring that mothers have optimal nutritional status before and during pregnancy, strengthening health services for pregnant women until postpartum by focusing on improving the quality and delivery of health services, and designing efforts to encourage changes in maternal and family behavior for the better, especially in feeding and childcare practices.

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