RELATIONSHIP BETWEEN RESPONSIVE FEEDING BEHAVIOR AND THE INCIDENCE OF STUNTING IN TODDLERS 6 - 36 MONTHS

Devis Avrilian Aisyah[1], Yani Widyastuti[2], Yuliasti Eka Purnamaningrum[3]
[1,2,3]Midwifery Department, Poltekkes Kemenkes Yogyakarta, Jl. Mangkuyudan MJ III/304, Yogyakarta, 555143
[1]E-mail: avriliandevis@gmail.com

ABSTRACT

Purpose: *Stunting is still a serious health problem in Indonesia with a prevalence in Gunungkidul of 23.5%. Responsive feeding is an important part of complementary feeding and reduces risk stunting because children receive food in appropriate quantity and quality.*
Method: *This study employed an observational design with a case-control approach and was conducted in February 2025 in the working area of Saptosari Public Health Center. The study population consisted of 494 children aged 6–36 months. A purposive sampling technique was used to select 82 participants, divided into case and control groups. The research instrument used was the Responsive Feeding Practices Assessment Tool (RFPAT). Data analysis included univariate and bivariate analyses using the chi-square statistical test.*
Finding: *The majority of respondents in this study were categorized as non-low birth weight (84.1%) and were mothers who were not employed (85.4%). Most mothers had a secondary level of education (70.7%) and came from families with an income below the regional minimum wage (58.5%). There is a significant relationship to behavior responsive feeding with the incident stunting (p=0.009). On external variables, there is a relationship between birth weight (p=0.034) and mother's last education (p=0,039) with incidence stunting. Employment status and family income were not related to the incident stunting.*
Novelty: *There is a significant association between responsive feeding behavior and stunting in children aged 6–36 months in the working area of Saptosari Public Health Center.*

Keywords:
Behavior, Responsive Feeding, Stunting

INTRODUCTION

Stunting remains a significant public health issue in Indonesia and globally, characterized by impaired linear growth resulting in children being shorter than their age peers[1]. According to the World Health Organization (WHO), approximately 148.1 million children under the age of five worldwide were stunted in 2022, equivalent to 22.3% of the global population in this age group. Despite modest reductions over the years, this figure remains far from the global target of reducing stunted children to 89 million by 2030[2]. Stunting not only reflects chronic nutritional deficiencies but also serves as an indicator of broader health inequalities and socio-economic disadvantages.

In Indonesia, the prevalence of stunting has shown a declining trend, dropping from 27.7% in 2019 to 21.6% in 2022. The Indonesian Health Survey (SKI) 2023 revealed a national prevalence of 21.5%[3]. However, regional disparities persist, with the Special Region of Yogyakarta recording a prevalence of 18%, and Gunungkidul Regency presenting the highest rate within the province at 23.5%. In particular, Saptosari Public Health Center reported 305 stunting cases, marking it as a priority area for intervention[4]. These figures underscore the need for evidence-based, localized strategies to mitigate stunting and its long-term consequences.

Stunting affects not only physical growth but also cognitive development, academic performance, and future productivity[5]. Children who are stunted have a higher risk of delayed motor skills, lower IQ scores, and diminished learning capabilities[6]. In the long term, they are more susceptible to non-communicable diseases, such as diabetes and cardiovascular disorders[7]. Families with stunted children often face emotional and financial stress, further perpetuating cycles of poverty and poor health[8]. Stunting reduces workforce productivity due to limited education and physical capacity, while increasing national healthcare costs from long-term management of associated health conditions throughout an individual's life[9].

Globally, stunting prevention is a core component of the Sustainable Development Goals (SDGs), specifically Goal 2: Zero Hunger. In Indonesia, the issue has been prioritized through the National Medium-Term Development Plan (RPJMN) 2020–2024, focusing on nutrition-specific and sensitive interventions during the first 1,000 days of life (HPK)[10]. The Indonesian government provides supplementary feeding (PMT) for undernourished mothers and children during the first 1,000 days (HPK)[11]. This is supported by Posyandu, offering health services and nutrition education[12]. Although these initiatives are operational in Saptosari, stunting remains prevalent, indicating a gap between intervention efforts and actual behavioral practices.

Stunting is influenced by various factors, with poor maternal nutrition during pregnancy increasing the risk of low birth weight infants, a major predictor of stunting[13]. Limited access to nutritious food during HPK also significantly affects child growth[14]. Parental education and socio-economic status influence caregiving and feeding practices. Parents with good nutritional knowledge better understand the need for proper intake during growth and development[15]. Poor sanitation and hygiene cause repeated infections like diarrhea, malaria, and respiratory illness, which disrupt nutrient absorption[16]. Zullaiha (2021) found that children without exclusive breastfeeding for six months were 4.2 times more likely to be stunted[17]. Addressing stunting needs a comprehensive, multi-factor approach[18,19].

One key factor influencing early childhood nutrition is feeding behavior[20]. Responsive feeding, promoted by WHO, is a caregiver's approach that recognizes and responds to a child's hunger and fullness cues[21]. This method supports a positive eating environment, builds self-regulation, and strengthens emotional bonds during meals[22,23] Studies show responsive feeding improves food intake, nutrient absorption, and linear growth[24]. However, this practice is often misunderstood or unevenly applied in communities. Cultural norms, time pressure, low health education, and limited awareness of child-led feeding contribute to continued non-responsive feeding. These habits can worsen nutritional deficits and growth, even when food is available[25]. Thus, addressing feeding behavior is essential to strengthen nutrition programs.

The age range of 6–36 months is a critical period when children shift from exclusive breastfeeding to complementary feeding, accompanied by rapid developmental changes. Disruptions in feeding behavior during this phase can lead to irreversible growth faltering[26]. Responsive feeding is therefore not only a nutritional approach but also essential for supporting child development and long-term health. While past research has shown links between responsive feeding and child nutrition, findings vary across settings. Factors such as maternal education, socioeconomic status, and caregiver-child interaction may influence outcomes. However, little is known about these relationships in rural Indonesian areas, where cultural and structural conditions may differ.

This study addresses that gap by examining the correlation between responsive feeding and stunting among children aged 6–36 months in Saptosari. It also explores how factors like birth weight, maternal education, employment, and household income relate to feeding behaviors and child growth. The findings aim to enrich the literature on responsive caregiving while offering practical insights for public health efforts. Results can guide midwives and nutrition officers at local health centers in developing targeted interventions and may inform policy improvements in stunting prevention. Ultimately, this study contributes to Indonesia's broader goal of reducing stunting and improving child well-being.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Stunting is a condition characterized by impaired growth and development in children under five years old, primarily caused by chronic malnutrition sustained over a prolonged period, which ultimately results in a body height that falls significantly below the standard threshold for their age group[27]. This condition frequently emerges during the first 1000 days of life, a particularly critical and sensitive period essential for the optimal development of brain cells and neurological function. Stunting can potentially lead to numerous long-term health complications, many of which may be irreversible[18]. Affected children are likely to experience limitations in achieving their full physical and cognitive potential in the future[19].

Stunting is shaped by inadequate growth faltering and catch-up growth, as well as the failure to achieve optimal growth, indicating that even children born with normal birth weight may experience stunting if their subsequent nutritional needs are not adequately met[28]. According to the Ministry of Health, stunting is defined as a child under five years old having a height-for-age z-score below -2 standard deviations (stunted) or below -3 SD (severely stunted).[29] If anthropometric measurements show that a child's height falls below these thresholds, it may indicate the presence of stunting[29]. Children affected by stunting often face delays in physical development, including impaired muscle growth and cognitive disorders[30].

The World Health Organization (WHO) identifies nutrition, health, and socio-economic conditions as key factors contributing to stunting. Maternal malnutrition and adolescent pregnancy increase the risk of low birth weight (LBW), which is strongly associated with stunting[31]. A study by Shiva, Rajeshw, and Jang Bahadur (2022) reported that children born with LBW were 19 times more likely to suffer from stunting compared to those with normal birth weight[32]. Similarly, research by Rahmatul (2023) demonstrated a significant association between LBW and stunting incidence[33]. This is because LBW infants are more vulnerable to complications in growth and development[34].

Maternal employment can also significantly influence the incidence of stunting in children, primarily due to the limited time mothers are able to spend with their children, which may result in poorly monitored food intake and reduced maternal attention toward the child's overall growth and developmental progress[35]. Research conducted by Savita (2020) found a clear relationship between maternal employment and stunting, indicating that children of working mothers were five times more likely to experience stunting compared to those of non-working mothers[35]. Family income also plays a role; higher income allows families to meet their nutritional needs more effectively[36].

Timely early initiation of breastfeeding (EIBF) is important to support optimal child growth. Children who are not exclusively breastfed in the first six months face a higher risk of stunting due to poor nutrient intake and lower immunity[37]. Infectious diseases, such as diarrhea and pneumonia, are among the direct causes that worsen a child's nutritional status and lead to stunting[43]. Such infections reduce food intake, hinder nutrient absorption, lead to direct nutrient loss, and increase metabolic demands[36]. Maternal education influences child growth by shaping feeding and caregiving practices. Educated mothers tend to have better knowledge of nutrition and health, which supports optimal child development[39].

The food system plays a crucial role in the availability of nutritious foods, particularly those rich in essential micronutrients like animal-based protein. According to research by Hendraswari (2021), children with low protein intake are 3.22 times more likely to suffer from stunting[40]. Toddlers who consume less protein than needed are more susceptible to being stunted. Linear growth slows when dietary intake is insufficient[41]. Poor sanitation and limited access to clean water increase the likelihood of recurring infections such as diarrhea, which contributes to stunting[31]. Another factor is caregiver behavior; inadequate attention to children's hunger and satiety cues or poor responsive feeding practices lead to imbalanced nutrient intake[42].

The impact of stunting extends across multiple critical sectors, including physical health, cognitive development, and long-term economic capacity. Children who are stunted typically have compromised immune systems, which makes them more susceptible to frequent and recurring illnesses such as respiratory infections and diarrhea[43]. In addition, they often experience various developmental delays, including impairments in motor skills as well as cognitive difficulties that affect memory retention and problem-solving abilities[44]. Stunting not only contributes to adverse health outcomes in children but also imposes a financial burden on families by increasing household healthcare expenditures over time[45].

In adulthood, physical health outcomes are significantly influenced by the effects of childhood stunting. This condition increases the risk of developing chronic diseases, including hypertension, obesity, and various other non-communicable diseases that affect long-term well-being[46]. Stunting also imposes lasting cognitive impairments, which ultimately diminish an individual's economic productivity over time. Stunted children are more likely to grow into less productive adults who have

reduced income potential and limited job opportunities[47]. Furthermore, the impact of stunting is transgenerational; children born to stunted mothers are more likely to experience growth delays, perpetuating a cycle of malnutrition and poor health across generations[48].

Stunting prevention requires a holistic and well-coordinated approach that extends beyond the provision of adequate nutrition alone. It must also emphasize the importance of improving sanitation conditions, ensuring equitable access to essential healthcare services, and enhancing public education to raise awareness about early childhood development. Therefore, multi-sectoral interventions are critically necessary and should include adequate nutrition during the first 1,000 days of life, consistent access to clean water and improved sanitation facilities, affordable and high-quality healthcare, widespread public education and awareness initiatives, as well as the effective implementation of integrated policies across various relevant sectors[49].

The theoretical framework of this study integrates two major models: the Precede-Proceed Model of Health Behavior Change developed by Lawrence Green, and the WHO Conceptual Framework on Childhood Stunting. These comprehensive models are combined to explain the multifactorial complexity of determinants contributing to stunting and to position responsive feeding practices within a broader ecological and behavioral context. According to the Precede-Proceed model, health behavior is determined by three key categories of factors: predisposing, enabling, and reinforcing factors[50]. These interact to influence an individual's motivation and ability to adopt and maintain health-related behavior[51].

Simultaneously, the WHO's Conceptual Framework identifies stunting as the outcome of both immediate and underlying causes. The integration of these frameworks enables a more comprehensive understanding of how behavioral and environmental factors coalesce to influence stunting. Previous research supports the theoretical assumption that responsive feeding is associated with improved nutritional status. Ulfatul Latifah (2021) reported that children whose mothers practiced responsive feeding had significantly lower odds of being stunted compared to those who used coercive or neglectful feeding styles. These studies emphasize that feeding behavior is not merely a matter of what is fed, but how it is fed[52].

A literature review conducted by Azwar (2023) further confirmed a significant relationship between responsive feeding practices and stunting incidence, showing that improved feeding behavior could help prevent stunting[53]. Similarly, a study conducted in Zambia found that responsive feeding practices significantly reduced the risk of stunting among children under five by fostering a conducive eating environment and encouraging higher food intake[54]. Ineffective feeding habits can trigger stunting in children. Research by Dayuningsih (2021) reported that toddlers exposed to poor feeding practices were six times more likely to experience stunting compared to those receiving optimal care[55].

Effective feeding practices are therefore considered critical in efforts to reduce the prevalence of stunting among young children. One of the primary factors contributing to stunting is the caregiver's inability or failure to consistently implement responsive feeding techniques in daily child care routines[56]. Caregivers are expected to follow essential principles of responsive feeding, such as directly feeding or assisting the child in self-feeding, responding promptly to hunger and satiety cues, feeding patiently, offering age-appropriate food textures, maintaining eye contact, minimizing distractions, and responding appropriately to food refusal[57]. In addition, nutritional quality must be ensured during responsive feeding practices.

A study in Ethiopia showed that responsive feeding significantly improved food intake compared to non-responsive feeding[57]. Furthermore, to address stunting, children must receive adequate nutritional interventions, including protein for growth, iron for oxygen transport, carbohydrates for energy, and calcium for bone development[58]. For children aged 6–36 months, both the quality and quantity of food are crucial, as this is a key stage for establishing proper eating habits and preferences[59]. Research by Nurfitri (2021) revealed that most stunted children had mothers who misunderstood responsive feeding, equating it with forcing the child to eat. In reality, responsive feeding involves actively and attentively engaging in the child's feeding process[52].

Given the evidence and theoretical underpinnings, this research proposes a conceptual framework that places stunting as the dependent variable and responsive feeding behavior as the primary independent variable. Additional independent variables include birth weight, maternal education, maternal employment, and household income. These variables are explored as potential confounders or effect modifiers in the relationship between feeding behavior and child growth. From this, specific hypotheses can be formulated as follows: There is a significant association between responsive feeding behavior and the incidence of stunting in children aged 6–36 months in the working area of Saptosari Community Health Center, Gunungkidul Regency.

RESEARCH METHODOLOGY

This study employed a quantitative research design using a case-control approach to investigate the relationship between responsive feeding behavior and the incidence of stunting among toddlers aged 6–36 months. The case-control design was considered appropriate for examining the effect of specific exposure responsive feeding behavior on the outcome of stunting. The study was conducted in February 2025 in the working area of the Saptosari Community Health Center, Gunungkidul Regency, Yogyakarta. The target population consisted of 494 toddlers registered at the health center, and a purposive sampling technique was used to select 82 participants, with 41 children in each group (stunted and non-stunted).

Exclusion criteria included toddlers with congenital abnormalities or chronic diseases that could affect growth, such as cerebral palsy or congenital heart defects, to ensure stunting was primarily due to nutritional or caregiving factors. Matching was performed based on age and sex to control for confounding variables and improve group comparability. The primary independent variable was responsive feeding behavior, assessed using the Responsive Feeding Practices Assessment Tool (RFPAT), a validated instrument covering feeding interaction, hunger and satiety cues, and feeding techniques. The dependent variable, stunting, was defined as a height-for-age z-score (HAZ) below -2 SD based on WHO standards and local anthropometric records.

Several external variables were measured to identify possible confounders, including birth weight, maternal education level, maternal employment status, and household income. Birth weight data were retrieved from Maternal and Child Health (MCH) books or health records, while data on maternal education, employment, and income were obtained through structured interviews. Data collection was conducted through face-to-face interviews using the RFPAT questionnaire and a demographic form. Enumerators were trained midwifery students with instruction in research ethics and interview techniques. Anthropometric data were gathered from nutritional surveillance registers and MCH books, and all information was checked for accuracy and consistency.

The collected data were entered into a spreadsheet and analyzed using SPSS version 25.0. Univariate analysis was used to describe the frequency distribution of each variable, including sociodemographic and feeding behavior characteristics, using percentages, means, and standard deviations. Bivariate analysis using the Chi-square test was performed to assess associations between responsive feeding and stunting, as well as between external variables and stunting status, with significance at $p < 0.05$. To strengthen validity, the instrument was pre-tested on 20 respondents outside the research site. Reliability was confirmed with Cronbach's alpha ≥ 0.70, and content validity was reviewed by experts.

This study adhered strictly to ethical principles in conducting human subject research. Ethical clearance was obtained from the Health Research Ethics Committee of Poltekkes Kemenkes Yogyakarta prior to data collection. All participants were thoroughly informed about the study's objectives, procedures, potential risks, and benefits. Written informed consent was obtained from each respondent before participation. Confidentiality and anonymity were strictly maintained throughout the research process. Personal identifiers were removed during data analysis and reporting. Furthermore, participants were given the freedom to withdraw from the study at any stage without consequences, in line with ethical standards of voluntary participation and respect for autonomy.

Findings from univariate and bivariate analyses were synthesized to determine whether responsive feeding behavior was significantly associated with stunting incidence. The hypothesis was

accepted or rejected based on statistical significance at the 95% confidence level. These results contribute to the growing body of evidence on child nutrition and early childhood care. The study's findings have practical implications for health promotion strategies, especially in low-resource settings. Midwives, nutrition workers, and public health planners can use this evidence to design community-based interventions aimed at reducing stunting. Promoting responsive feeding behavior may serve as an effective strategy to improve child growth outcomes in rural Indonesia.

RESULTS AND DISCUSSION

Table 1. Comparison of Characteristics Between Case and Control Groups

Variable	Stunting Incidence				Total	
	Stunting		Non Stunting			
	n	%	n	%	n	%
Child's Birth Weight						
Low Birth Weight (LBW)	10	24,4	3	7,3	13	15,9
Not Low Birth Weight (Not LBW)	31	75,6	38	92,7	69	84,1
Mother's Highest Education Level						
Primary Education	10	24,4	8	19,5	18	22,0
Secondary Education	31	75,6	27	65,9	58	70,7
Higher Education	0	0,0	6	14,6	6	7,3
Mother's Employment Status						
Employed	4	9,8	8	19,5	12	14,6
Unmployed	37	90,2	33	80,5	70	85,4
Household Income						
< UMR	27	65,9	21	51,2	48	58,5
≥ UMR	14	34,1	20	48,8	34	41,5
Responsive feeding behavior						
Poor	9	22,0	2	4,9	11	13,4
Fair	10	24,4	5	12,2	15	18,3
Good	13	31,7	12	29,3	25	30,5
Very Good	9	22,0	22	53,7	31	37,8
Total	41	100	41	100	82	100

Based on Table 1, the majority of toddlers had a normal birth weight, with 84.1% not classified as low birth weight (LBW). Regarding maternal education, most mothers had a secondary education level, accounting for 70.7% of respondents. In terms of maternal employment status, the vast majority of mothers were unemployed, comprising 85.4% of participants. For household income, most families earned below the regional minimum wage (UMR), representing 58.5% of the sample. Regarding responsive feeding behavior, nearly half of the mothers demonstrated very good responsive feeding practices, with 37.8% falling into this category.

Table 2. The Relationship Between External Variables and the Dependent Variable

Variable	Stunting Incidence				Total		X^2 (df)	p value
	Stunting		Non Stunting					
	n	%	n	%	n	%		
Child's Birth Weight								
Low Birth Weight (LBW)	10	24,4	3	7,3	13	15,9	4,479	0,034
Not Low Birth Weight (Not LBW)	31	75,6	38	92,7	69	84,1	(1)	
Variable	**Stunting Incidence**				**Total**		**X^2 (df)**	**p value**
	Stunting		**Non Stunting**					
	n	**%**	**n**	**%**	**n**	**%**		
Mother's Highest Education Level								
Primary Education	10	24,4	8	19,5	18	22,0	6,498	0,039
Secondary Education	31	75,6	27	65,9	58	70,7	(2)	
Higher Education	0	0,0	6	14,6	6	7,3		

Mother's Employment Status								
Employed	*4*	*9,8*	*8*	*19,5*	*12*	*14,6*	*1,562*	*0,211*
Unmployed	*37*	*90,2*	*33*	*80,5*	*70*	*85,4*	*(1)*	
Household Income								
< UMR	*27*	*65,9*	*21*	*51,2*	*48*	*58,5*	*1,809*	*0,179*
≥ UMR	*14*	*34,1*	*20*	*48,8*	*34*	*41,5*	*(1)*	
Total	*41*	*100*	*41*	*100*	*82*	*100*		

Based on Table 2, a statistically significant association was found between birth weight and stunting incidence (p-value = 0.034 or <0.05). This finding aligns with the research conducted by Rahmatul (2023), which established a link between low birth weight (LBW) and the occurrence of stunting[33]. The association indicates that LBW infants are more vulnerable to growth and developmental disorders. According to Lestari (2021), these infants often face complications in development due to immature organ systems and inadequate nutritional reserves needed for optimal growth[34]. LBW infants may struggle to adapt to complementary feeding, resulting in poor nutrient absorption and growth deficits[33].

This study also found a significant relationship between the mother's education level and the incidence of stunting (p-value = 0.039 or <0.05). This supports Setiawati (2025), who reported a similar finding in the Marusu Health Center area[39]. The association suggests that mothers with higher educational backgrounds are more likely to possess adequate knowledge and skills for preventing stunting. Educated mothers are better at ensuring a nutritious diet for their children and recognizing early signs of health problems[60]. They also tend to implement effective parenting practices, including balanced nutrition and early detection of developmental delays, which help mitigate the risk of stunting[39].

However, this study found no significant relationship between maternal employment status and stunting incidence (p-value = 0.211 or >0.05). This result corresponds with Djogo (2021), who also reported no correlation between maternal employment and stunting[62]. This suggests that working mothers can still provide quality care with proper time management and social support. According to Nurdiantami (2022), employed mothers can balance work and caregiving effectively through time allocation strategies[63]. Effective time management allows working mothers to provide nutrition, emotional care, and minimize the negative impact of employment on child development[64]. Family support, especially a husband's help with childcare and household tasks, can ease a mother's burden and improve parenting[65].

Furthermore, this study showed no significant association between household income and stunting (p-value = 0.179 or >0.05). This indicates that higher income does not automatically ensure better nutritional outcomes. According to Husna (2023), family income is not always prioritized for nutritional needs but is also used for other expenses such as schooling and transportation. Income contributes positively to nutrition only when combined with parental awareness and proper household budgeting[66]. This includes purchasing nutritious food, maintaining sanitation, and accessing healthcare services. Parental knowledge in managing resources is essential to support child growth and prevent stunting, even in families with limited financial means.

Table 3. The Relationship Between Independent and Dependent Variables

Variabel	***Stunting Incidence***				***Total***		***X^2 (df)***	***p value***
	Stunting		*Non Stunting*					
	n	*%*	*n*	*%*	*n*	*%*		
Responsive feeding behavior								
Poor	*9*	*22,0*	*2*	*4,9*	*11*	*13,4*	*11,613*	*0,009*
Fair	*10*	*24,4*	*5*	*12,2*	*15*	*18,3*	*(3)*	
Good	*13*	*31,7*	*12*	*29,3*	*25*	*30,5*		
Very Good Sangat Baik	*9*	*22,0*	*22*	*53,7*	*31*	*37,8*		
Total	*41*	*100*	*41*	*100*	*82*	*100*		

Based on Table 3, the results of this study indicated a statistically significant relationship between responsive feeding behavior and the incidence of stunting (p-value = 0.009 or <0.05). This finding suggests that responsive feeding is not merely a feeding method but a critical approach to improving dietary intake. A study in Ethiopia found that responsive feeding significantly enhanced food consumption among children aged 9–11 months[67] Responsive feeding fosters emotional and social interaction, positively influencing nutritional adequacy. It involves recognizing hunger and satiety cues, feeding with patience, and creating a positive mealtime environment. Forced feeding can cause stress, rejection, and imbalanced nutrient intake[57].

This study emphasized that responsive feeding practices should be taught to mothers as part of feeding strategies. These practices reduce food refusal and create a nurturing feeding environment. Ayalew & Belachew (2021) demonstrated that training mothers through community cadres led to improvements in feeding behavior and child nutrition. Responsive feeding ensures adequate food intake in terms of quality and quantity[68]. Black (2022) also emphasized the emotional dimension of feeding, which helps children develop better self-regulation and openness to dietary variety[69]. Therefore, responsive feeding is a key strategy for preventing stunting and enhancing child health and development.

The association between responsive feeding and stunting in this study highlights its role in the biological mechanisms underlying growth. According to Aubuchon (2020), stress during feeding such as when a child is forced or scolded can increase cortisol levels, which inhibits growth hormone activity (GH/IGF-1) and reduces appetite[70]. A calm and positive emotional state promotes better digestion and nutrient absorption. Responsive feeding also helps children develop internal appetite regulation, learning to eat according to hunger and fullness cues. This supports efficient nutritional intake, optimal hormone function, and improved physical growth outcomes.

Feeding practices during the 6–36 month age range are essential for establishing healthy eating habits and preferences. Nurfitri (2021) reported that many stunted children had mothers who misunderstood responsive feeding and instead practiced coercive feeding[52]. Effective feeding is a form of communication that requires understanding the child's signals and engaging with empathy and attentiveness. When feeding is done in a supportive and non-coercive manner, children are more likely to consume sufficient food, experience less stress, and grow according to their potential. Responsive feeding, therefore, serves as both a behavioral and physiological intervention to prevent stunting.

CONCLUSION

This study found a significant association between responsive feeding behavior and the incidence of stunting in children aged 6–36 months in the working area of Saptosari Public Health Center, Gunungkidul Regency. Children who received non-responsive feeding were more likely to experience growth faltering, indicating that caregiver interaction during mealtime plays a crucial role in determining nutritional status. Responsive feeding, characterized by attentiveness to hunger and satiety cues, timely feeding, and a positive feeding environment, contributes to better dietary intake and improved child growth. Therefore, improving caregiver behavior is essential in efforts to reduce stunting rates in rural areas.

The study found that maternal education and birth weight were significantly associated with stunting, while maternal employment and household income were not. This suggests that knowledge and behavior, especially a mother's understanding of child nutrition, may influence growth more than economic factors. Stunting prevention should therefore focus on educational efforts that improve feeding practices. Responsive feeding should also be part of health promotion activities. Integrating this approach into community-based services like posyandu allows mothers to receive practical, culturally appropriate guidance from trained health workers, improving their ability to support healthy child growth through better feeding behavior.

Future research should explore causal pathways through longitudinal study designs or structured intervention trials to strengthen the evidence base. Further investigations are needed to examine the role of paternal involvement in child nutrition, sociocultural beliefs surrounding feeding,

and practical barriers faced by mothers in applying responsive feeding practices. These insights could inform the creation of tailored behavior change models that are sensitive to local contexts and address both individual-level behaviors and broader systemic constraints. To ensure sustainability of stunting reduction efforts, collaboration among health workers, educators, and policymakers is essential in promoting and institutionalizing responsive feeding interventions in Indonesia.

REFERENCES

Ejigu H, Tafese Z. Stunting at birth: linear growth failure at an early age among newborns in Hawassa city public health hospitals, Sidama region, Ethiopia: a facility-based cross-sectional study. J Nutr Sci [Internet]. 2023 May 30;12(9):e63. Available from: https://www.cambridge.org/core/product/identifier/S2048679023000460/type/journal_article

UNICEF, WHO, WORLD BANK. Level and trend in child malnutrition. World Heal Organ [Internet]. 2023;4. Available from: https://www.who.int/publications/i/item/9789240073791

Kementrian Kesehatan. Profil Kesehatan Indonesia 2023. 2024. 100 p.

Dinkes. Profil Kesehatan Kabupaten GunungKidul 2023. Dinas Kabupaten Gunungkidul. 2023;3–4.

Alam MA, Richard SA, Fahim SM, Mahfuz M, Nahar B, Das S, et al. Erratum: Impact of early-onset persistent stunting on cognitive development at 5 years of age: Results from a multi-country cohort study (PLoS One (2020) 15:1 (e0227839) DOI: 10.1371/journal.pone.0227839). PLoS One. 2020;15(2):1–16.

Aurora WID, Sitorus RJ, Flora R. Effect of Stunting on Intelligence Quotient (IQ) of School-Age Children. Proc 3rd Green Dev Int Conf (GDIC 2020). 2021;205(Gdic 2020):176–80.

Ahmad R, Akter F, Haque M. Editorial: Diet and nutrition for non-communicable diseases in low and middle-income countries. Front Nutr [Internet]. 2023 Mar 28;10(8). Available from: https://www.frontiersin.org/articles/10.3389/fnut.2023.1179640/full

Fang Y, Luo J, Boele M, Windhorst D, van Grieken A, Raat H. Parent, child, and situational factors associated with parenting stress: a systematic review. Eur Child Adolesc Psychiatry [Internet]. 2024;33(6):1687–705. Available from: https://doi.org/10.1007/s00787-022-02027-1

Büttner N, Heemann M, De Neve JW, Verguet S, Vollmer S, Harttgen K. Economic Growth and Childhood Malnutrition in Low- and Middle-Income Countries. JAMA Netw Open [Internet]. 2023 Nov 9;6(11):e2342654. Available from: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2811562

Milwan, Sunarya A. Stunting Reduction in Indonesia: Challenges and Opportunities. Int J Sustain Dev Plan. 2023;18(7):2223–31.

Saminan, Rabbany N, Aini Z, Zulkarnain, Murzalina C. Implementation of Stunting Prevention Program in Indonesia: Literature Review. Media Publ Promosi Kesehat Indones. 2024;2(1):56–61.

Pratiwi D, Yulian V. Peran Posyandu terhadap Pencegahan Stunting di Indonesia: Sebuah Studi Literatur. Pros Semin Nas. 2023;5(2):51–8.

Rikayoni R, Rahmi D. Hubungan Status Gizi Ibu Selama Hamil Dengan Kejadian Stunting Pada Bayi Usia 0-36 Bulan Di Wilayah Kerja Puskesmas Sijunjung Tahun 2022. Menara Ilmu. 2023;17(1):97–106.

Prijono M, Andarwulan N, Palupi NS. Perbedaan Konsumsi Pangan dan Asupan Gizi pada Balita Stunting dan Normal di Lima Provinsi di Indonesia. J Mutu Pangan Indones J Food Qual. 2020;7(2):73–9.

Sarkar P, Rifat MA, Bakshi P, Talukdar IH, Pechtl SML, Lindström Battle T, et al. How is parental education associated with infant and young child feeding in Bangladesh? a systematic

literature review. Vol. 23, BMC Public Health. 2023. 1–46 p.

Khoirun Nisa DM, Sukesi TW. Hubungan Antara Kesehatan Lingkungan dengan Kejadian Stunting di Wilayah Puskesmas Kalasan Kabupaten Sleman. J Kesehat Lingkung Indones. 2022;21(2):219–24.

Zullaiha S, Purnamaningrum YE, Santi MY. Factors affecting incident of stunting in children under five years. J Kesehat Ibu dan Anak. 2021;15(2):139–47.

Himawati EH, Fitria L. Hubungan Infeksi Saluran Pernapasan Atas dengan Kejadian Stunting pada Anak Usia di Bawah 5 Tahun di Sampang. J Kesehat Masy Indones [Internet]. 2020 May 27;15(1):1. Available from: https://jurnal.unimus.ac.id/index.php/jkmi/article/view/5819

Putri MG, Irawan R, Mukono IS. Hubungan Suplementasi Vitamin A, Pemberian Imunisasi, dan Riwayat Penyakit Infeksi Terhadap Kejadian Stunting Anak Usia 24-59 Bulan di Puskesmas Mulyorejo, Surabaya. Public Heal Nutr Media [Internet]. 2021;10(1):72. Available from: https://e-journal.unair.ac.id/MGK/article/view/24946

Latifah U, Prastiwi RS, Baroroh U. The Responsive Feeding Behavior and Stunting Incident on Toddlers. J Kebidanan. 2020;10(2):143–8.

Andayani K, Kuswati, Hayatullah MM. Hubungan Pengetahuan, Sikap dan Perilaku Ibu terhadap Pemberian Makanan Pendamping ASI Usia 6-24 Bulan di PMB "M" Kecamatan Bojonggede Kabupaten Bogor Provinsi Jawa Barat Tahun 2023. JMSWH J Midwifery Sci Women's Heal. 2023;3(2):71–7.

Chowdhury R, Manapurath R, Sandøy IF, Upadhyay RP, Dhabhai N, Shaikh S, et al. Impact of an integrated health, nutrition, and early child stimulation and responsive care intervention package delivered to preterm or term small for gestational age babies during infancy on growth and neurodevelopment: study protocol of an individually . Trials [Internet]. 2024;25(1):1–14. Available from: https://doi.org/10.1186/s13063-024-07942-z

UNICEF. Nurturing young children through responsive feeding is key for a child ' s. Nuturing Care Early Child Dev [Internet]. 2022;1–16. Available from: https://nurturing-care.org/wp-content/uploads/2023/06/NTCTRF.pdf

Killion KE, Corcoran A, Romo-Palafox MJ, Harris JL, Kagan I, Gilbert L, et al. Responsive Feeding Practices to Promote Healthy Diets: A Mixed Method Study among Low-Income Caregivers with Toddlers. Nutrients. 2024;16(6).

Larasati AQ, Sudargo T, Susetyowati S. Responsive feeding ibu dan asupan makan anak stunting usia 2-5 tahun. J Gizi Klin Indones. 2022;18(4):164.

Scott N, Delport D, Hainsworth S, Pearson R, Morgan C, Huang S, et al. Ending malnutrition in all its forms requires scaling up proven nutrition interventions and much more: a 129-country analysis. BMC Med. 2020;18(1):1–19.

Aurima J, Susaldi S, Agustina N, Masturoh A, Rahmawati R, Tresiana Monika Madhe M. Faktor-Faktor yang Berhubungan dengan Kejadian Stunting pada Balita di Indonesia. Open Access Jakarta J Heal Sci. 2021;1(2):43–8.

Fernanda L. Reformulasi Hubungan Warga Dan Pemerintah Dalam Penanganan Stunting Di Kabupaten Kulon Progo. J Soc Bridg [Internet]. 2024;2:103–17. Available from: https://www.bk3s.org/ojs/jsb/article/view/42%0Ahttps://www.bk3s.org/ojs/jsb/article/download/42/38

Pohan HM, Harahap FS, Elisa, Pardede N, Harahap HJ. Kontribusi kuliah kerja nyata terhadap pencegahan stunting pada balita. J Olahraga dan Kesehat Indones [Internet]. 2023;3(2):109–14. Available from: https://jurnal.stokbinaguna.ac.id/index.php/jok

Esha D, Mubin A, Hakim F. Mengenal Lebih Dalam Ciri – ciri Stunting , Cara Pencegahannya , dan Perilaku Hidup Sehat dan Bersih. J Chem Inf Model. 2023;2(6):24–8.

Tadele TT, Gebremedhin CC, Markos MU, Fitsum EL. Stunting and associated factors among 6–23 month old children in drought vulnerable kebeles of Demba Gofa district, southern Ethiopia. BMC Nutr [Internet]. 2022;8(1):1–11. Available from: https://doi.org/10.1186/s40795-022-00501-2

Halli SS, Biradar RA, Prasad JB. Low Birth Weight, the Differentiating Risk Factor for Stunting among Preschool Children in India. Int J Environ Res Public Health. 2022;19(7).

Rahmatul A, Suhartini T, Supriyadi B. Hubungan Berat Badan Lahir Rendah (Bblr) Dengan Kejadian Stunting Pada Anak Usia 1-3 Tahun. Nutr J. 2019;3(1):36.

Lestari ES. Hubungan ASI Eksklusif dan BBLR dalam Pertumbuhan Bayi Usia 1-2 Tahun. Syntax Idea. 2021;3(1):80–97.

Savita R, Amelia F. Hubungan Pekerjaan Ibu, Jenis Kelamin, dan Pemberian Asi Eklusif Terhadap Kejadian Stunting Pada Balita 6-59 Bulan di Bangka Selatan. J Kesehat Poltekkes Kemenkes Ri Pangkalpinang. 2020;8(1):1.

Amalia RA, Rasyida AU, Buana AW, Adam OM. Hubungan Antara Pendapatan Keluarga, Pola Pemberian Makan, dan Pengetahuan Ibu tentang Gizi dengan Kejadian Stunting di Wilayah Kerja Puskesmas Bangkingan. Surabaya Biomed J. 2023;

Ainul D, Mikawati, Rizky P. Hubungan Inisiasi Menyusui Dini, ASI Eksklusif, dan Pemantauan Tumbuh Kembang dengan Kejadian Stunting dan Wasting. Bul Ilmu Kebidanan dan Keperawatan. 2024;3(03):5–8.

Lefebo BK, Kassa DH, Tarekegn BG. Factors associated with stunting: gut inflammation and child and maternal-related contributors among under-five children in Hawassa City, Sidama Region, Ethiopia. BMC Nutr. 2023;9(1):1–8.

Setiawati E. Hubungan Pendidikan Ibu Balita dengan Kejadian Stunting di Puskesmas Marusu Kabupaten Maros. J Aafiyah Heal Res. 2025;6(1):27–33.

Hendraswari CA, Purnamaningrum YE, Maryani T, Widyastuti Y, Harith S. The determinants of stunting for children aged 24-59 months in Kulon Progo District 2019. Kesmas. 2021;16(2):71–7.

Natalia V, Hertati D. Analisis Faktor-faktor yang Mempengaruhi Kejadian Stunting di Kalimantan Tengah Berdasarkan Literature Review. J Surya Med. 2023;9(3):181–9.

Indriyani O, Rahardjo N. Edukasi Pentingnya MP-ASI Sebagai Upaya Pencegahan Stunting Pada Masa Golden Anak. J Midwifery Community [Internet]. 2023;1(1):22–8. Available from: https://jurnal.uns.ac.id/jmc/article/view/71551

Morales F, Montserrat-de la Paz S, Leon MJ, Rivero-Pino F. Effects of Malnutrition on the Immune System and Infection and the Role of Nutritional Strategies Regarding Improvements in Children's Health Status: A Literature Review. Nutrients. 2024;16(1):1–16.

Daracantika A, Ainin A, Besral B. Pengaruh Negatif Stunting terhadap Perkembangan Kognitif Anak. J Biostat Kependudukan, dan Inform Kesehat. 2021;1(2):113.

Yani DI, Rahayuwati L, Sari CWM, Komariah M, Fauziah SR. Family Household Characteristics and Stunting: An Update Scoping Review. Nutrients. 2023;15(1):1–17.

Kusuma L, Aulia V, Hadhikul M. Risks of Stunting and Interventions to prevent Stunting. J Community Engagem Heal. 2023;6(2):241–5.

Ekholuenetale M, Barrow A, Ekholuenetale CE, Tudeme G. Impact of stunting on early childhood cognitive development in Benin: evidence from Demographic and Health Survey. Egypt Pediatr Assoc Gaz. 2020;68(1).

Kalinda C, Qambayot MA, Ishimwe SMC, Regnier D, Bazimya D, Uwizeyimana T, et al. Leveraging multisectoral approach to understand the determinants of childhood stunting in Rwanda: a systematic review and meta-analysis. BMC Public Health. 2024;13(1):1–12.

Syafrawati S, Lipoeto NI, Masrul M, Novianti N, Gusnedi G, Susilowati A, et al. Factors driving and inhibiting stunting reduction acceleration programs at district level: A qualitative study in West Sumatra. PLoS One [Internet]. 2023;18(3 MARCH):1–21. Available from: http://dx.doi.org/10.1371/journal.pone.0283739

Notoadmodjo S. Promosi Kesehatan & Prilaku Kesehatan. Jakarta: EGC. 2012.

Mahendra D, Jaya IMM, Lumban AMR. Buku Ajar Promosi Kesehatan. Progr Stud Diploma Tiga Keperawatan Fak Vokasi UKI. 2019;1–107.

Nurfitri M. Hubungan Pengetahuan Responsive Feeding Ibu Dengan Kejadian Stunting Pada Anak Usia 12-24 Bulan. Semin Nas Keperawatan "Strategi Optim Status Kesehat Ment Masy dengan Perawatan Paliat di Era Pandemi Covid 19" Tahun 2021. 2021;99–104.

Azwar A, Tane R, Sartika MS D. Responsive Feeding dan Stunting Pada Anak : Literature Review. J Nurs Innov. 2023;2(3):73–80.

Mugode RH, Puoane T, Michelo C, Steyn NP. "Feeding a child slowly:" a responsive feeding behavior component likely to reduce stunting: Population-based observations from rural Zambia. J Hunger Environ Nutr [Internet]. 2020;13(4):455–69. Available from: https://doi.org/10.1080/19320248.2017.1403409

Dayuningsih, Permatasari Endah Astika Tria SN. Pengaruh Pola Asuh Pemberian Makan Terhadap Kejadian Stunting Pada Balita 0-59 Bulan. J Kesehat Masy Andalas [Internet]. 2021;14(2):3–11. Available from: http://jurnal.fkm.unand.ac.id/index.php/jkma/

Siringoringo ET, Syauqy A, Panunggal B, Purwanti R, Widyastuti N. Karakteristik Keluarga Dan Tingkat Kecukupan Asupan Zat Gizi Sebagai Faktor Risiko Kejadian Stunting Pada Baduta. J Nutr Coll. 2020;9(1):54–62.

Arintasari F. Analisis Stunting 1000 Hari Pertama Kehidupan (Hpk) dengan Perilaku Responsive Feeding dan Pemberian Therapy Massage Eating Difficulties untuk Menunjang Tumbuh Kembang. J TSCNers. 2022;16(1):1–23.

Item I, Munawaroh M, Astuti RP. Hubungan Pola Makan, Status Gizi Dan Peran Nakes Terhadap Pencegahan Stunting Di Wilayah Puskesmas Simpang Rimba Kab Bangka Selatan Tahun 2022. SENTRI J Ris Ilm. 2023;2(9):3466–75.

Yogiisworo N, Wahyurianto I, Yasin, P R, Teresia. Faktor Dominan Responsive Feeding Pada Ibu Dengan Anak Stunting Di Desa Penambangan Wilayah Kerja Puskesmas Semanding Kabupaten Tuban. J Multidisiplin Indones. 2023;2(9):2621–31.

Rezaeizadeh G, Mansournia MA, Keshtkar A, Farahani Z, Zarepour F, Sharafkhah M, et al. Maternal education and its influence on child growth and nutritional status during the first two years of life: a systematic review and meta-analysis. eClinicalMedicine [Internet]. 2024;71(April):102574. Available from: https://doi.org/10.1016/j.eclinm.2024.102574

Haidar M., Sharaf N., Al-Dankali MM. UNUSUAL PRESENTATION OF ACUTE INTESTINAL OBSTRUCTION DUE TO TRANSVERSE COLON VOLVULUS IN LATE PREGNANCY. J Syst Softw. 2020;

Djogo H. Hubungan Pekerjaan Ibu Dan Praktik Asi Ekslusif Dengan Kejadian Stunting Pada Balita Di Kabupaten Timor Tengah Selatan. J Kesehat. 2021;8(2):89–97.

Nurdiantami Y, Shabriyyah NF, Riyanti FD, Muhammad RF, Muhayati DA. Hubungan Karakteristik Ibu dengan Sikap Responsif Anak. J Epidemiol Kesehat Indones. 2022;6(1):45–52.

Putrihapsari R, Fauziah PY. Manajemen Pengasuhan Anak Usia Dini Pada Ibu Yang Bekerja: Sebuah Studi Literatur. JIV-Jurnal Ilm Visi. 2020;15(2):127–36.

Millah NW, Bahrodin A. Pengaruh Dukungan Sosial Dan Pola Asuh Orang Tua Terhadap Perkembangan Psikososial. Al-Adawat J Pendidik Guru Madrasah Ibtidaiyah. 2022;1(02):151–66.

Husna A, Willis R, Rahmi N, Fahkrina D. Hubungan Pendapatan Keluarga dan Pemberian ASI Eksklusif dengan Kejadian Stunting pada Balita Usia 24-36 Bulan di Wilayah Kerja Puskesmas Sukajaya Kota Sabang. J Healthc Technol Med. 2023;9(1):583.

Atsbha MK. Effect of food texture and responsive feeding on food intake of infants aged 9–11 months, West Gojjam, Ethiopia. Cogent Food Agric [Internet]. 2021;7(1). Available from: https://doi.org/10.1080/23311932.2021.1924431

Ayalew CA, Belachew T. Effect of complementary feeding behaviour change communication delivered through community-level actors on infant growth and morbidity in rural communities of West Gojjam Zone, Northwest Ethiopia: A cluster-randomized controlled trial. Matern Child Nutr. 2021;17(3):1–13.

Black MM, Tofail F, Hodges EA, Bann CM, Hamadani JD, Aktar S, et al. Rethinking Responsive Feeding: Insights from Bangladesh. Nutrients. 2022;14(15):1–13.

Aubuchon-Endsley NL, Swann-Thomsen HE, Douthit N. Maternal prenatal cortisol and breastfeeding predict infant growth. Int J Environ Res Public Health. 2020;17(21):1–13.