

ASSOCIATION BETWEEN FEEDING RULES AND STUNTING AMONG CHILDREN AGED 6-24 MONTHS

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Abstract

Stunting is a chronic nutritional problem that commonly affects children aged 6–24 months due to prolonged inadequate nutrient intake. Another factor contributing to stunting is suboptimal feeding practices. This study aimed to evaluate the quality of feeding practices (feeding rules) through three main aspects: consistency of meal schedules, responsive feeding techniques, and mealtime environment arrangement. The assessment used a questionnaire based on Chatoor's 1–9 scale, where a score of 7–9 indicated good practices, 4–6 represented moderate practices, and 0–3 reflected poor practices. This cross-sectional quantitative study was conducted at the Grogol Petamburan Health Center, West Jakarta, and involved 133 mothers and their children selected through total sampling. Data were collected using questionnaires and anthropometric measurements. The results showed that 21.8% of children were stunted. The proportion of stunting was higher among mothers with poor feeding rule practices (36.4%) compared to those with moderate–good practices (17.0%). A significant association was found between feeding rules and stunting ($p = 0.019$; OR = 2.79; 95% CI = 1.157–6.730). It can be concluded that appropriate implementation of feeding rules plays a crucial role in preventing stunting.

Keywords: anthropometry, children, Chi-Square, feeding rules, stunting

Introduction

Food plays a crucial role in a child's growth and development. However, many parents face difficulties when their children enter the age of 6–24 months (the complementary feeding period), during which children often show food refusal behaviors such as tightly closing their mouths or spitting out food. This behavior can lead to inadequate nutrient intake, increasing the risk of stunting within this age group. Instead of improving feeding patterns, parents often seek prescriptions for vitamins or appetite-enhancing supplements from doctors. In fact, what children truly need is access to a balanced and nutritious diet, especially during this critical period, to support optimal growth (Kementerian Kesehatan Republik Indonesia, 2024; Nasar, 2014; Galuh, 2016).

Stunting, defined by the Indonesian Pediatric Society (IDAI) as short stature resulting from chronic malnutrition, remains a significant health burden in Indonesia. In 2022, Indonesia ranked fourth globally as

the country with the highest number of stunted children under five. One of the contributing factors is improper feeding practices or dietary patterns. Parents' lack of understanding in recognizing hunger cues, establishing meal schedules, and regulating portions of main meals and snacks also plays a role. Unfortunately, feeding difficulties at the age of 6–24 months are often considered normal, causing the long-term impact, such as stunting, to be overlooked (Garg et al., 2020; Sjarif et al., 2024; Bernard-Bonnin, 2006).

The key to addressing feeding difficulties lies in implementing feeding rules (basic principles of feeding). These rules include regulating the timing, method, portion, and duration of meals (maximum 30 minutes), as well as scheduling main meals and snacks consistently. According to the World Health Organization (WHO), feeding rules also encompass creating a supportive environment and mealtime routine. These principles are highly relevant, particularly in managing *Gerakan Tutup Mulut* (GTM) or “mouth-closing behavior,” as they provide a structured framework for the feeding process (World Health Organization, n.d., 2023; Yusmar, 2015).

Consistent implementation of feeding rules plays an essential role in shaping healthy eating habits and improving the child's nutrient intake necessary for optimal growth. By adhering to fundamental rules regarding schedule, environment, and feeding procedures, parents can help overcome feeding refusal and prevent nutritional deficiencies such as stunting. Therefore, understanding and applying feeding rules should be prioritized over reliance on supplements (World Health Organization, 2023; Yusmar, 2015; Dwi Ananta et al., 2023).

Methods

This study employed an analytical survey with a cross-sectional design to examine the relationship between the independent variable (implementation of feeding rules) and the dependent variable (stunting) at a single point in time. The research was conducted in the working area of the Grogol Petamburan Subdistrict Health Center, West Jakarta, during January–February 2024. This period was chosen to ensure the completeness and reliability of data collection.

Population and Sample: The population consisted of all mothers or primary caregivers with children aged 6–24 months registered at the health center. A total of 133 respondents were included, obtained through inclusive selection criteria (children aged 6–24 months, residing within the health center's working area, and mothers willing to provide informed consent). The required sample size was calculated using the two-proportion hypothesis test formula (160 respondents were expected); however, 27 data entries were incomplete, leaving 133 respondents for analysis.

Instruments: Data were collected using a structured questionnaire designed to assess mothers' knowledge and practices regarding feeding rules (such as meal scheduling, portion size, feeding techniques, and mealtime environment). Children's anthropometric measurements were taken directly: body weight was measured using a baby scale, and length/height was measured using an infantometer or microtoise. Nutritional status (stunting) was determined based on the WHO growth chart for length/height-for-age (children under 2 years old) with a cut-off value of z-score < -2 SD.

Data Collection: Researchers and trained health personnel provided instructions, after which mothers completed the questionnaire independently with minimal assistance. The research team measured children's anthropometry according to standardized procedures (infants in a lying position, toddlers standing). Data were verified immediately to

ensure completeness.

Data Analysis: Data were analyzed descriptively (frequency and percentage) to describe respondent characteristics and study variables. The association between the implementation of feeding rules (categorized as poor vs. moderate–good) and nutritional status (stunted vs. not stunted) was tested using the Chi-square test ($\alpha = 0.05$). In addition, the odds ratio (OR) was calculated to estimate the risk of stunting based on feeding rule categories. All analyses were performed using standard statistical software.

Research Ethics: This study received ethical approval from the University Ethics Committee and permission from the local health center. All respondents provided written informed consent voluntarily before the interview.

Results

The study involved 133 children aged 6–24 months. Most of the children were male (55.6%), with a mean age of 15.3 months (SD 5.25). The majority of mothers demonstrated a moderate to good level of feeding rule implementation (75.2%), while 24.8% showed poor implementation. The prevalence of stunting among the sample was 21.8% (29 out of 133 children). Details of respondent characteristics and key outcomes are presented in Table 1.

Table 1. Characteristics of respondents and nutritional status (n = 133)

Variable	Category/Statistic	Frequency (n)	Percentage (%)	Numerical Measure
Gender	Male	74	55,6	
	Female	59	44,4	
Age (months)	Mean			15,30 ± 5,250
	Minimum			6
	Maximum			24
Level of Feeding Rule Implementation	Poor	33	24,8	
	Fair-Good	100	75,2	
Nutritional Status	Stunting	29	21,8	
	Not Stunting	104	78,2	

The Chi-square test results showed a significant association between the level of maternal feeding rule implementation and the incidence of stunting in children ($p = 0.019$). Among children whose mothers had poor feeding rule implementation, 36.4% (12/33) were stunted, whereas in the moderate–good implementation group, only 17.0% (17/100) were stunted. Children whose mothers practiced poor feeding rule implementation had a 2.79 times higher risk of experiencing stunting compared to those with good implementation (OR = 2.79; 95% CI: 1.16–6.73). Thus, the better the implementation of feeding rules, the lower the proportion of stunting.

Table 4.5. Association Between the Level of Feeding Rule Implementation and the Incidence of Stunting

Feeding Rule Implementation	Stunting n (%)	Not Stunting	p-value	Prevalence Ratio (PR)	Odds Ratio (OR)
Poor	12 (36,4%)	21 (63,6%)	0,019	2,14 (1,14-4,00)	2,79 (1,16-6,73)
Moderate - Good	17 (17,0%)	83 (83,0%)			

Discussion

This study confirms the significance of feeding rules as reported by Ananta et al. (2023) while providing a novel contribution through the quantification of stunting risk. While Ananta identified a strong correlation between feeding rules and the eating habits of stunted children ($r = 0.424$; $p = 0.000$), our study demonstrates that poor implementation of feeding rules increases the risk of stunting by 2.79 times ($OR = 2.79$; 95% CI: 1.16–6.73; $p = 0.019$). The marked difference in stunting prevalence between mothers with poor (36.4%) and good (17.0%) feeding rule implementation—a 19.4% gap—reinforces the evidence that structured feeding practices are a critical determinant of nutritional status, rather than merely an aspect of eating behavior.

This finding aligns with the UNICEF conceptual framework on the causes of malnutrition, which emphasizes that inadequate feeding practices are one of the immediate causes of stunting, alongside insufficient dietary intake and recurrent infections (UNICEF, 2020). Moreover, according to the *Division of Responsibility* model proposed by Satter (2000), parents are responsible for deciding *what*, *when*, and *where* food is offered, while children determine *how much* and *whether* to eat. Failure to maintain this balance—such as excessive control, force-feeding, or irregular feeding schedules—can disrupt a child’s appetite regulation and nutrient adequacy, leading to growth faltering.

The uniqueness of this study lies in its focus on direct stunting outcomes among the general population of children aged 6–24 months ($n = 133$), contrasting with Ananta’s work, which examined children already diagnosed with stunting ($n = 87$). The finding that 75.2% of mothers in the moderate–good category successfully reduced stunting prevalence to 17.0% (compared with 36.4% in the poor group) provides epidemiological evidence for a practical recommendation: feeding rule–based interventions—such as limiting mealtime duration to ≤ 30 minutes and scheduling regular snacks—could reduce the relative burden of stunting by up to 55% $[(36.4\% - 17.0\%) / 36.4\%]$. This forms a concrete basis for health workers to prioritize practical skill training for mothers, particularly among the 24.8% identified as a high-risk group.

These findings also support the WHO’s “Care for Child Development” (CCD) framework, which encourages responsive and structured feeding as part of early childhood care. The significant reduction in stunting among mothers practicing good feeding rules indicates that behavioral interventions targeting feeding routines may be as critical as dietary interventions targeting nutrient content. Hence, this research not only strengthens previous correlational findings but also offers a quantifiable basis for community-based health promotion strategies.

The consistency of findings with Ananta et al. (2023) reinforces the relevance of Satter’s (2000) Division of Responsibility theory and the UNICEF framework on stunting within the Indonesian context. The stunting prevalence of 21.8% in our sample aligns with national data, underscoring the urgency of integrating feeding rules into the National

Strategy for Stunting Prevention, particularly under Pillar 2 (Healthy and Clean Living Behavior). Unlike Ananta, who emphasized the synergy between maternal knowledge and feeding rule application, the $OR = 2.79$ in this study indicates that consistent implementation of feeding rules—even with limited nutritional knowledge—may serve as an independent protective factor.

This supports the hypothesis that maternal behavioral consistency may moderate the effect of knowledge on child growth outcomes, a mechanism supported by the Health Belief Model (HBM) and Social Cognitive Theory (Bandura, 1986), where perceived control and self-efficacy play a central role in sustained behavior change. Therefore, interventions like *Bina Keluarga Balita (BKB)* and *Posyandu* programs could be enhanced by incorporating behavioral coaching modules, focusing not only on what to feed but also on how to implement structured feeding practices in daily routines.

Similar to Ananta's study, the main limitation of this research is the cross-sectional design, which restricts causal inference and may introduce reporting bias in the measurement of feeding rules. Confounding factors such as household income, recurrent infections, and parenting style—unmeasured in both studies—could influence the observed relationship. The generalizability of these findings should be approached with caution given sample differences: Ananta focused on stunted children, while this study included a heterogeneous population with specific demographic characteristics (55.6% male; mean age 15.3 months).

Future longitudinal studies are needed to confirm causality and explore mediating variables, particularly maternal mental health, dietary diversity, and family psychosocial environment, which have been identified as emerging determinants of stunting (Black et al., 2020). Despite these limitations, the current study provides a strong empirical foundation for developing targeted, behaviorally oriented interventions to reduce stunting prevalence in early childhood.

Conclusion

In conclusion, there is a significant association between maternal implementation of feeding rules and the incidence of stunting among children aged 6–24 months in the Grogol Petamburan Community Health Center. Children cared for by mothers with poor implementation of feeding rules had nearly three times the risk of stunting compared to those whose mothers demonstrated moderate to good implementation. In other words, the better the practice of feeding rules, the lower the child's risk of experiencing stunting.

Based on these findings, several recommendations are proposed:

- For Health Workers: Regular, practical nutrition education on feeding rules should be provided, for instance through counseling at *posyandu* (community health posts), parenting classes, or during child immunization sessions. Educational materials should be presented in a simple and applicable manner, enabling mothers to easily understand the importance of maintaining regular meal schedules, appropriate portion sizes, and a comfortable mealtime environment.
- For Mothers/Caregivers: It is recommended to pay closer attention to child-feeding techniques. In addition to ensuring the quality of complementary feeding (MPASI), mothers should apply feeding rules such as maintaining a consistent meal schedule, respecting the child's hunger and satiety cues, and creating a pleasant, pressure-free mealtime atmosphere. These practices can improve the child's nutritional intake and help prevent stunting.

- For Future Researchers: Future studies are encouraged to employ a longitudinal design to explore the causal relationship between feeding rules and child nutritional status. Further research should include key confounding variables (such as family socioeconomic status, maternal health, frequency of childhood illness, and complementary food quality) and utilize direct observational methods to assess child-feeding practices in order to minimize reporting bias.
- For Government and Program Developers: The findings of this study can serve as a foundation for designing family-based and mother-empowerment stunting prevention programs. Local governments and community health centers (*Puskesmas*) can integrate feeding rule education into child health services (*posyandu*, *Bina Keluarga Balita* [BKB] / *Bina Keluarga Remaja* [BKR]) to systematically reduce stunting rates.

Overall, this study emphasizes that improving parental understanding and practice of feeding rules is a key step in preventing stunting among children under two years of age.

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Author Contribution and Competing Interest

The author independently conducted all stages of the research, including conceptualization, data collection, data analysis, interpretation of results, and manuscript preparation. The supervisor provided continuous academic guidance and critical review during the writing process.

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