

Maternal Parenting Practices as a Socio-Cultural Determinant of Stunting and Motor Development among Toddlers in Jeneponto Regency

Sri Wahyuni Bahrum^{1*}, Andi Syarifah Irmadani², Sitti Hasrah Ibrahim³, Kurniati Akhfar⁴, Nurhayani Jamil⁵

¹Gunung Sari College of Health Sciences, Makassar, Indonesia.

^{2,3}Pelamonia Institute of Health Sciences, Makassar, Indonesia.

⁴Mega Buana Midwifery Academy, Indonesia.

⁵Midwifery Professional Education Program, Nursing Faculty, Hasanuddin University, Indonesia.

*email : swbahrun@gmail.com

Abstract

Stunting is a chronic nutritional condition that can impair physical growth and motor development in early childhood, with maternal parenting practices considered an important factor influencing its occurrence. This study aimed to examine the association between maternal parenting practices, stunting, and motor skill development among children aged 24-59 months at Bontomate'ne Community Health Center, Jeneponto Regency, Indonesia. A quantitative cross-sectional design was employed involving 44 children selected through purposive sampling. Maternal parenting practices were assessed using a structured questionnaire, nutritional status was determined based on height-for-age Z-scores (HAZ), and motor development was evaluated using the Denver Developmental Screening Test (DDST). Associations between variables were analyzed using Fisher's Exact Test. The findings showed that most mothers demonstrated sufficient parenting practices, accounting for 42 children (95.5%), while good parenting practices were identified in only 2 children (4.5%). Of the total participants, 43 children (97.7%) were classified as stunted. A significant association was found between maternal parenting practices and stunting ($p = 0.045$). Stunting was also significantly associated with delayed motor development ($p = 0.035$), with severely stunted children showing a greater tendency to experience delays in motor skills. These findings indicate that maternal parenting practices are associated with the risk of stunting, which is subsequently related to motor development in young children. Therefore, early interventions integrating parenting education and nutritional support are important to prevent stunting and promote optimal growth and motor development during early childhood.

Keywords : *Early Childhood, Maternal Parenting, Motor Development, Stunting*

Introduction

Stunting is a chronic nutritional problem resulting from prolonged insufficient nutrient intake, particularly during the early stages of a child's life. It is characterized by a height-for-age or length-for-age Z-score below -2 standard deviations ($HAZ < -2 SD$), based on height/length-

for-age indices (PB/U or TB/U). Stunting not only reflects impaired physical growth but also affects the child's development and future quality of life (Bahrum *et al.*, 2023).

Globally, stunting remains a significant public health concern. The World Health Organization reports that more than half of the world's stunted children reside in Asia, followed by Africa. Southeast Asia ranks second in the number of children affected by stunting. Overall, approximately 151 million children under five years of age worldwide are stunted, indicating that stunting continues to be a major challenge in improving child health in developing countries, including Indonesia (Pademme, 2020; Tarmizi, 2024).

In Indonesia, the prevalence of stunting based on the 2023 Indonesia Health Survey was 21.5%. Although this shows a slow decline compared to previous years, it remains far from the national target of 14%. In South Sulawesi Province, stunting prevalence in 2024 remained above the national average. In Jeneponto Regency, despite a downward trend, stunting continues to pose a serious challenge to child nutrition (TPPS Sulawesi Selatan, 2024).

Stunting generally begins during the first 1,000 days of life, covering pregnancy to the child's second birthday. Nutritional and health disturbances during this period can lead to permanent growth impairment. The causes of stunting are multifactorial, including individual factors such as dietary intake, birth weight, and health status; household factors such as food quality and parenting practices; and environmental factors including socioeconomic conditions and access to health services. Maternal parenting practices are a modifiable indirect factor that plays a crucial role in stunting prevention (Rahayu, 2023).

Several studies have shown a relationship between parental, particularly maternal, parenting practices and the incidence of stunting in children. Suboptimal parenting, including inappropriate feeding practices, inadequate attention to child health, and poor environmental sanitation, can increase the risk of chronic nutritional deficiencies.

Beyond physical growth, stunting also affects child development, including motor development. Motor skills, encompassing both gross and fine motor abilities, are critical indicators of early childhood development. Stunted children tend to have lower muscle mass and physical strength, as well as impaired nervous system development, increasing their risk of delayed motor skill acquisition compared to children with normal nutritional status (Afrida and Aryani, 2022; Paramita *et al.*, 2022; Musaidah *et al.*, 2025).

The age of 24-59 months represents a critical period for motor development, during which children develop fundamental skills such as walking, jumping, drawing, and stacking objects. This process heavily depends on adequate nutrient intake and environmental stimulation. Nutritional deficiencies, including protein, iron, and other micronutrients, in stunted children can hinder muscle and nervous system development, leading to delays in motor skills acquisition (Organization, 2020; Rico-González *et al.*, 2024).

In rural Indonesian communities, maternal parenting practices are deeply embedded in socio-cultural norms, traditions, and household dynamics. Feeding behaviors, child stimulation, hygiene practices, and health-seeking behaviors are often influenced by intergenerational beliefs, local customs, and collective family decision-making rather than individual maternal knowledge alone. In such settings, mothers may possess adequate knowledge yet face structural and cultural constraints that limit the implementation of optimal parenting practices.

Preliminary findings in the Bontomate'ne Community Health Center area indicate variation in maternal parenting practices, which may contribute to the high prevalence of stunting in this community. The predominance of sufficient parenting practices in this study suggests that maternal caregiving behaviors are not solely determined by individual knowledge or educational attainment, but are also shaped by socio-cultural norms, family structures, and environmental constraints. In many rural households, childcare responsibilities are shared with extended family

members, where traditional beliefs regarding child feeding and stimulation may override biomedical recommendations.

Furthermore, parenting in rural contexts is frequently shaped by extended family involvement, maternal workload, socioeconomic limitations, and culturally rooted perceptions of child growth and development. These socio-cultural dimensions may explain why moderate parenting practices remain prevalent despite relatively adequate educational backgrounds among mothers, and why stunting persists even when basic caregiving practices are reportedly sufficient.

Although the relationships between maternal parenting and stunting, as well as between stunting and motor development, have been studied separately, research examining the three variables concurrently remains limited. Therefore, this study aims to analyze the relationship between maternal parenting practices and stunting, as well as the association between stunting status and motor skill development in children aged 24-59 months in the Bontomate'ne Community Health Center area, Jeneponto Regency. The findings are expected to inform comprehensive interventions for stunting prevention and child developmental stimulation at the primary healthcare level.

Methods

This study employed a quantitative approach with a cross-sectional design to examine the relationship between maternal parenting practices, stunting, and motor development in young children. The study population comprised all children aged 24-59 months registered within the service area of Puskesmas Bontomate'ne, Jeneponto Regency. A total of 44 children were selected using purposive sampling based on predefined inclusion and exclusion criteria. The inclusion criteria were: children aged 24–59 months registered at Puskesmas Bontomate'ne, and willingness of parents or guardians to provide informed consent. The exclusion criteria were: children with chronic illness or severe disability affecting motor development, and children who were absent during the data collection period. Ethical approval for this study was obtained from the Institutional Ethics Committee of the Nani Hasanuddin College of Health Sciences (Approval No. 378/STIKES-NH/KEPK/V/2025). Data on maternal parenting practices were collected using a 23-item structured questionnaire, Item validity was evaluated using an r-table value of 0.312 at $\alpha = 0.05$. Internal reliability was assessed using Cronbach's alpha. While the children's nutritional status was assessed using the height/length-for-age Z-score (HAZ) according to WHO standards. Motor development was evaluated using the Denver Developmental Screening Test (DDST), which measures both gross and fine motor skills. Descriptive statistics were used to summarize the sample characteristics, and inferential analysis was conducted to assess the relationships between maternal parenting practices, stunting, and motor development in children.

Result

Table 1. Family Characteristics Based on Age, Education, and Occupation, 2025 (n=44)

Characteristic	N	Percentage (%)
Family Age (years)		
20–25	6	13.6
26–30	14	31.8
31–35	10	22.7
36–40	6	13.6
≥41	8	18.2

Characteristic	N	Percentage (%)
Relation to Child		
Mother	37	84.1
Father	2	4.5
Others	5	11.4
Education Level		
No School	2	4.5
Elementary School (SD)	13	29.5
Junior High School (SMP)	3	6.8
Senior High School (SMA)	22	50.0
Diploma/Bachelor	4	9.1

Source: Primary Data, 2025

Based on Table 1, among the 44 respondents, most parents were aged 26–30 years (14 respondents, 31.8%). The majority of respondents had completed senior high school education (22 respondents, 50.0%).

Table 2. Characteristics of Toddlers Based on Age and Gender at Bontomate'ne Community Health Center in 2025 (n=44)

Characteristic	N	Percentage (%)
Toddler Age (Months)		
24-36	16	36.4
37-48	23	52.3
49-59	5	11.4
Gender		
Female	27	61.4
Male	17	38.6

Source: Primary Data, 2025

Based on Table 2, among the 44 respondents, the majority of children were aged 37–48 months, totaling 23 children (52.3%). In terms of gender, most of the children were female, with 27 children (61.4%).

Table 3. Frequency Distribution of Respondents Based on Mother's Parenting Style Category (n=44)

Implementation of Parenting	N	Percentage (%)
Good	2	4.5
Sufficient	42	95.5

Source: Primary Data, 2025

Based on the table above, out of 44 respondents, the majority of mothers applied a sufficient parenting style, accounting for 42 individuals (95.5%). Only 2 respondents (4.5%) practiced a good parenting style.

Table 4 Categories of Stunting Incidents at Bontomate'ne Health Center (n=44)

Stunting Incidence	Frequency (n)	Percentage (%)
Stunting	43	97.7
Not Stunting	1	2.3

Source: Primary Data, 2025

Based on Table 4, of the 44 respondents, 43 (97.7%) of the 44 children at the Bontomate'ne Community Health Center experienced stunting. One child (2.3%) did not experience stunting.

Table 5. Frequency Distribution of Motor Skills in Children Aged 24-59 Months in the Working Area of the Bontomate'ne Health Center, Jeneponto Regency

Motor Skills	Frequency (n)	Percentage (%)
Normal	21	47.7%
Delayed	23	52.3%
Total	44	100%

Source: Primary Data, 2025

Based on the table above, among the 44 children, 21 (47.7%) demonstrated normal motor development, while 23 children (52.3%) experienced motor delays. This indicates that more than half of the children in this study showed delayed motor skills. Such findings highlight that motor development delays remain a significant concern among children aged 24-59 months in the Puskesmas area. These delays may be influenced by various factors, particularly nutritional status, including stunting, which affects muscle growth, nervous system development, and movement coordination. The high proportion of motor delays also underscores the need for increased attention to child development stimulation at home, as well as targeted interventions by healthcare professionals at the Puskesmas. Children who do not receive adequate stimulation are not only more likely to experience motor delays but also face potential challenges in other developmental domains, such as cognitive and socio-emotional skills.

Table 6. Results of The Fisher's Exact Test Of The Relationship Between Maternal Parenting Patterns And The Incidence Of Stunting At The Bontomate'ne Community Health Center

Community Health Center							
Maternal Parenting	Stunting Incidence				Total		Fisher Exact Test
	Stunting		Not Stunting				
	F	%	F	%	F	%	
Good	1	2.3	1	2.3	2	4.5	0.045
Sufficient	42	95.5	0	0	42	95.5	
Total	43	97.7	1	2.3	44	100	

Source: Primary Data, 2025

Based on the table above, the study found that 2 children (4.5%) had mothers with good parenting practices, and one of them was stunted. In contrast, among children whose mothers applied sufficient parenting practices, 42 children (95.5%) were all stunted. Statistical analysis using Fisher's Exact Test showed a p-value of 0.045 (<0.05), indicating a significant relationship

between maternal parenting practices and the incidence of stunting in children aged 24–59 months at Puskesmas Bontomate'ne.

Table 7 Presents The Relationship Between Stunting Status And Motor Development In Children Aged 24-59 Months In The Puskesmas Bontomate'ne Working Area, Jeneponto Regency.

Motor Skill								
Stunting Incidence		Normal		Delayed		Total		P-value
		n	%	n	%	N	%	
Short Stature Stunting		14	63.6%	8	36.4%	22	50%	0.035
Very Short Stature Stunting		7	31.8%	15	68.2%	22	50%	
Total		21	47.7%	23	52.3%	44	100%	

Source: Primary Data, 2025

Based on Table 7, among 22 children with short-stature stunting, 14 children (63.6%) demonstrated normal motor development, while 8 children (36.4%) showed developmental delays. Meanwhile, among 22 children with very short-stature stunting, 15 children (68.2%) experienced motor delays, and only 7 children (31.8%) had normal motor abilities. Overall, out of 44 respondents, 21 children (47.7%) had normal motor development, while 23 children (52.3%) exhibited delays. This distribution indicates that motor delays were more prevalent in children with very short-stature stunting compared to those with short-stature stunting. Statistical analysis yielded a p-value of 0.035 (<0.05), indicating a significant association between stunting status and motor development in children aged 24-59 months. Consequently, the more severe the stunting condition from short to very short the higher the risk of delayed motor development.

Discussion

1. Stunting Incidence in Children Aged 24–59 Months

The findings of this study indicate that the majority of children experienced stunting (43 children, 97.7%), while only 1 child (2.3%) was not stunted. The consequences of stunting extend beyond short-term effects, such as impaired brain development, delayed cognitive abilities, restricted physical growth, and metabolic disturbances, and may also result in long-term outcomes. Children affected by stunting are at risk of reduced learning capacity and academic performance, weakened immune function, increased susceptibility to illness, and a higher likelihood of developing chronic diseases such as diabetes, obesity, cardiovascular disease, stroke, and cancer in adulthood. Moreover, stunting may reduce work capacity and economic productivity, ultimately affecting overall quality of life (Higuera-Domínguez *et al.*, 2025).

Stunting is associated with delayed development in both gross and fine motor skills due to structural and functional changes in the brain. Specifically, stunted children exhibit delayed maturation of neurons in the cerebellum, which serves as the central hub for motor coordination. This delay is linked to reductions in myelin, cortical dendrites in the spinal medulla, and synaptic neurotransmission. The first two years of life constitute a critical period for brain development. During this time, inadequate nutrition may result in shortened apical dendrites, leading to

decreased brain function and impairments in motor skills, attention, memory, and cognitive abilities (Calista *et al.*, 2021).

Maternal awareness regarding proper nutrition significantly influences stunting incidence. Children of mothers who are highly conscious of nutritional needs are less likely to experience stunting, whereas insufficient attention to dietary quality, child stimulation, and health practices increases the risk. However, even a good parenting style does not guarantee that a child will be free from stunting if nutritional practices are not adequately implemented (Sari, 2022).

2. Maternal Parenting Practices

Maternal parenting encompasses behaviors related to guiding, caring for, and meeting children's needs, including nutritional provision, psychosocial stimulation, hygiene practices, and access to healthcare services. The results of this study indicate that the majority of respondents applied a sufficient parenting style (42 children, 95.5%), while only 2 respondents (4.5%) practiced good parenting.

These findings align with Melisa, (2022), who reported that most parents at Puskesmas Banjar II applied good parenting, influenced by parental education and occupation. Maternal education plays a crucial role as it affects knowledge related to child care and nutrition; higher education levels generally enhance the quality of parenting. Effective parenting includes practices such as exclusive breastfeeding, complementary feeding, psychosocial stimulation, hygiene and sanitation maintenance, and utilization of healthcare services (Li *et al.*, 2023).

The study assumes that the quality of maternal parenting is influenced by education (with 50% having completed senior high school) and knowledge of child care. This suggests that improving maternal education and access to information can enhance parenting quality, which in turn positively affects children's health and growth.

3. Relationship Between Maternal Parenting and Stunting

Fisher's Exact Test analysis revealed a significant relationship between maternal parenting and stunting incidence ($p = 0.045 < 0.05$). Children of mothers with good parenting practices had a lower risk of stunting compared to children of mothers with sufficient parenting. This finding is consistent with prior studies indicating a significant association between parenting practices—including feeding, psychosocial stimulation, hygiene, and sanitation—and stunting incidence (Dewi *et al.*, 2020; Evi, 2021).

Despite most mothers striving to apply adequate parenting, deficiencies remain in achieving optimal child-rearing practices. Suboptimal maternal parenting can increase the risk of stunting because inconsistent nutrition, stimulation, and healthcare provision directly affect children's growth and development.

Several factors influence maternal parenting quality, including education level, knowledge of nutrition and child health, caregiving experience, and family or environmental support. In this study, most mothers had senior high school education (50%), which affected their understanding and implementation of appropriate child-rearing practices, such as providing nutritious food, motor skill stimulation, and healthy lifestyle habits.

Environmental and socioeconomic conditions also impact parenting. Limited access to nutritious food, inadequate sanitation, and low family support can restrict a mother's ability to apply optimal parenting. Feeding practices, psychosocial stimulation, hygiene, and use of health services are interconnected aspects that determine successful parenting in preventing stunting.

Previous research supports these findings. Melisa, (2022) found that mothers with adequate education and knowledge were more likely to implement good parenting, while suboptimal parenting increased stunting risk.

Therefore, improving maternal parenting quality through nutrition education, motor skill stimulation, hygiene practices, and healthcare utilization from an early age is a key strategy to

prevent stunting and support optimal child development. Proper parenting interventions not only enhance physical growth but also contribute to motor and cognitive development, playing a vital role in building future human resource quality.

4. Relationship Between Stunting and Motor Development in Children Aged 24-59 Months

The study results indicate a significant relationship between stunting status and children's motor development ($p = 0.035$). Children categorized as severely stunted exhibited a higher prevalence of motor delays (15 children, 68.2%) compared to children with moderate stunting, most of whom demonstrated normal motor abilities (14 children, 63.6%).

These findings highlight the importance of early nutritional interventions and motor stimulation. Although appropriate stimulation can improve motor skills, children with stunting remain at higher risk of delayed motor development compared to non-stunted children. Previous studies have demonstrated that stunted children have a higher risk of delayed motor development compared with children with normal nutritional status (Afrida and Aryani, 2022).

Environmental stimulation also plays a crucial role. Activities such as building blocks, drawing, and gross motor play can help children develop muscle coordination and motor skills, even in the presence of stunting. Children receiving both optimal motor stimulation and supportive caregiving tend to achieve better motor outcomes than stunted children who lack such stimulation. According to the nurturing care framework, responsive caregiving, opportunities for early learning, and stimulation activities are essential components supporting children's physical and developmental outcomes (World Health Organization (WHO), 2018).

Motor development is not solely a biological process but is also influenced by social interaction and culturally mediated stimulation. Children living in environments with limited play resources and minimal adult engagement may experience delayed motor development, particularly when compounded by chronic undernutrition such as stunting (World Health Organization (WHO), 2018).

Therefore, interventions aimed at improving motor abilities in toddlers should combine adequate nutritional support, routine motor skill stimulation, and parental education on parenting practices that foster motor development. Early detection of stunting and motor delays is also essential to implement interventions during the critical developmental window of 24-59 months, which represents a golden period for child development.

5. Maternal Parenting and Fine Motor Skills in Stunted Toddlers

Maternal parenting plays an important role in supporting children's growth and development, including motor development. Motor development refers to the progressive acquisition of age-appropriate movement, coordination, and physical abilities. These developmental processes are influenced not only by nutritional status but also by the quality of stimulation, caregiving, interaction, and learning opportunities provided within the home environment. Responsive parenting and adequate developmental stimulation provide children with opportunities to explore, move, play, and practice age-appropriate skills.

In the present study, most mothers demonstrated adequate parenting practices, with 42 mothers (95.5%) categorized as having sufficient parenting practices, while only 2 mothers (4.5%) were categorized as having good parenting practices. Despite the predominance of sufficient parenting practices, the prevalence of stunting in the study population remained very high. This finding suggests that parenting practices alone may not fully explain the nutritional and developmental conditions of children. Rather, parenting practices may interact with broader socio-cultural, economic, and environmental conditions that influence child health and development. Previous studies have demonstrated a significant association between maternal parenting and fine motor development.

The high prevalence of stunting despite predominantly sufficient parenting practices highlights the importance of considering the wider context in which mothers provide care for their children. Factors such as household food availability, cultural feeding practices, maternal workload, socioeconomic conditions, and access to diverse and nutritious foods may influence children's nutritional status. Therefore, parenting that is categorized as sufficient based on behavioral indicators does not necessarily indicate that families have adequate resources or opportunities to meet all of their children's nutritional and developmental needs. From a broader social perspective, child development is shaped by the interaction between individual caregiving practices and the social environment in which families live.

Previous studies have reported associations between parenting practices and specific aspects of children's motor development. Calista et al., (2021), for example, reported that stunted toddlers who experienced suboptimal parenting had a higher likelihood of fine motor developmental delay than those who received better parenting. Such findings suggest that the quality of stimulation and caregiving may contribute to children's ability to achieve age-appropriate developmental milestones. However, the present study assessed child development using the overall DDST result without separately analyzing fine and gross motor domains. Therefore, the findings of this study are interpreted in terms of overall motor and developmental outcomes rather than as evidence of impairment in fine motor skills specifically.

In addition to nutritional adequacy, psychosocial stimulation and responsive caregiving are important components of children's developmental environment. Age-appropriate play, physical activity, interaction with caregivers, opportunities to explore the surrounding environment, and encouragement to participate in daily activities may provide children with opportunities to practice and develop their abilities. Parenting practices that provide consistent stimulation and responsive interaction may therefore support children's achievement of developmental milestones. Nevertheless, developmental outcomes should not be attributed to parenting alone, as they may also be influenced by nutritional status, health conditions, environmental opportunities, socioeconomic circumstances, and the broader social context of the family.

The findings of this study therefore indicate that maternal parenting should be understood as one component of a multifactorial process underlying child growth and development. Although sufficient parenting practices were observed among most mothers in this study, the high prevalence of stunting indicates that adequate parenting behavior may coexist with broader structural and environmental constraints. Interventions for stunted toddlers should consequently extend beyond parental education alone and incorporate nutritional support, developmental stimulation, responsive caregiving, and strategies addressing the social and environmental conditions that influence children's access to adequate nutrition and developmental opportunities. Such an integrated approach may provide greater opportunities for children aged 24–59 months to achieve age-appropriate developmental milestones.

6. Cultural and Social Dimensions of Motor Stimulation and Stunting Prevention

Motor stimulation in early childhood is often not perceived as an essential developmental need but rather as a natural process that will evolve with age. This cultural perspective may lead to a lack of structured play activities and minimal adult involvement in supporting children's motor development. In many communities, parenting practices are not limited to nutritional provision but also reflect how culture shapes the meaning of play, interaction, and early childhood learning. As a result, children raised in environments with limited stimulation are at greater risk of developmental delays, even when their basic nutritional needs are relatively met (UNICEF, 2019; WHO, 2020).

These findings highlight that stunting and delayed motor development are multidimensional issues rooted in interconnected social, cultural, and structural factors. The

persistence of these problems suggests that biological and nutritional explanations alone are insufficient to fully address child growth and development outcomes. Instead, broader contextual influences, including family dynamics, cultural beliefs, and community practices, play a crucial role in shaping both caregiving behaviors and developmental opportunities for children (Grantham-McGregor *et al.*, 2007; UNICEF, 2020).

Therefore, efforts to prevent stunting and improve motor development should extend beyond purely medical and nutritional approaches. Interventions must incorporate family- and community-based strategies that are culturally sensitive and contextually relevant. Parenting education programs should be adapted to the social realities of the community, involve extended family members, and consider local values and beliefs to ensure that interventions are both acceptable and sustainable. Such an approach is essential to achieving long-term improvements in child health and development (Black *et al.*, 2013; World Health Organization (WHO), 2018).

Study Limitations

This study has several limitations that should be considered when interpreting the findings. First, the sample consisted of only 44 children drawn from a single Puskesmas (Bontomate'ne) service area, which limits the generalizability of the results to the wider population. Second, the cross-sectional design does not allow causal relationships to be established between maternal parenting practices, stunting, and motor development; the associations reported should therefore be interpreted as correlational. Third, the distribution of key variables was highly imbalanced (e.g., 97.7% of children were stunted and 95.5% of mothers were categorized as applying sufficient parenting), which may have affected the statistical power and stability of the Fisher's Exact Test results. Finally, maternal parenting practices were measured through self-report, which is subject to recall and social desirability bias. Future studies with larger, more representative samples, longitudinal designs, and objective measures of parenting behavior are recommended.

Conclusion and Recommendations

This study demonstrates that maternal parenting is significantly associated with the incidence of stunting in children aged 24–59 months, and stunting, in turn, is significantly associated with delays in motor development among children aged 24–59 months. Most mothers applied sufficient parenting practices; however, the majority of children still experienced stunting, highlighting the need to improve both understanding and implementation of optimal parenting, including proper nutrition, motor skill stimulation, and overall child health care.

It is recommended that parents enhance their knowledge and adopt optimal parenting practices, while healthcare professionals should provide regular education on nutrition, motor skill stimulation, and early detection of stunting. Future research should involve larger sample sizes and consider environmental and socio-economic factors to provide a more comprehensive understanding of stunting risk.

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