

THE ROLE OF MATERNAL KNOWLEDGE ABOUT ANIMAL PROTEIN IN THE INCIDENCE OF STUNTING AMONG TODDLERS

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ABSTRACT

Stunting remains a major health problem among children under five in Indonesia because it affects physical growth, cognitive development, immunity, and future productivity. Limited maternal knowledge regarding nutrition, especially animal protein intake as a source of essential amino acids, is considered one of the contributing factors to stunting. This study aimed to analyze the relationship between maternal knowledge of animal protein and the incidence of stunting among toddlers in Sadananya Village, Sadananya Sub-district, Ciamis Regency, in 2025. A quantitative correlational design with a cross-sectional approach was used. The population consisted of 182 mothers of children under five, and 65 mothers with children aged 24–59 months were selected using purposive sampling. Data were collected using a valid and reliable closed-ended questionnaire and analyzed using the Spearman Rank test. The results showed a significant relationship between maternal knowledge of animal protein and the incidence of stunting ($p < 0.05$). Mothers with better knowledge tended to have children with normal nutritional status. These findings highlight the importance of strengthening maternal nutrition education, particularly regarding animal protein consumption, as an effort to prevent stunting effectively and sustainably.

Keywords: Maternal Knowledge, Animal Protein, Stunting, Toddlers, Nutrition Education

INTRODUCTION

Stunting remains a major public health problem worldwide, particularly in developing countries, because it affects children's physical growth, cognitive development, immune function, and future productivity. According to the World Health Organization (WHO), approximately 149.2 million children under five experienced stunting in 2020, with the highest prevalence occurring in Asia and Africa. In Indonesia, although the prevalence of stunting decreased from 27.7% in 2019 to 21.6% in 2022, the figure still exceeds the national target of below 14% established in the National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional/RPJMN*). This condition indicates that stunting remains a priority issue in child health development.

Stunting is defined as chronic growth failure in children characterized by a height-for-age Z-score below minus two standard deviations according to WHO standards. Chronic malnutrition occurring from pregnancy until the early years of life may result in long-term growth impairment. The consequences of stunting are not limited to impaired physical growth but also include increased susceptibility to infectious diseases, delayed motor and cognitive development, and reduced quality of human resources in the future (Aryu, 2020; Ruhayati, 2022).

Adequate nutritional intake, particularly animal protein consumption, plays an important role in preventing stunting among children under five. Animal protein contains complete essential amino acids and has higher digestibility compared to plant protein, making it essential for optimal child growth and development. Previous studies have reported that low consumption of animal protein remains a significant nutritional problem among children in

developing countries, including Indonesia (Sholikhah et al., 2022). Inadequate protein intake may inhibit the production of *Insulin-like Growth Factor-1* (IGF-1), which is essential for bone and tissue growth in children (Haryani et al., 2023).

Parental involvement, especially maternal roles, is crucial in fulfilling children's nutritional needs. Maternal knowledge regarding nutrition and sources of animal protein significantly influences family dietary patterns and food choices for children. Mothers with better nutritional knowledge are more capable of providing balanced and nutritious food for their children, whereas limited maternal knowledge may lead to inappropriate feeding practices and increase the risk of stunting (Murti et al., 2020). Previous studies have demonstrated a significant relationship between maternal nutritional knowledge and stunting incidence among toddlers (Salsabila et al., 2021). However, most existing studies primarily focus on general nutritional knowledge and have not specifically examined maternal knowledge about animal protein as an important factor in stunting prevention.

This gap in the literature indicates the need for further investigation focusing specifically on maternal knowledge of animal protein and its association with stunting incidence. In addition, data from the Indonesian Health Survey (*Survei Kesehatan Indonesia/SKI*) showed that the prevalence of stunting in Ciamis Regency increased from 18.6% in 2022 to 25.4% in 2023. Data from Sadananya Public Health Center also revealed an increase in stunting cases from 98 cases in 2024 to 129 cases in 2025. Preliminary findings indicated that several mothers had limited understanding regarding the importance of animal protein for child growth and tended to sell local protein sources rather than consume them within the household. These findings suggest that maternal knowledge remains an important challenge in stunting prevention efforts.

This study was conducted to contribute to the development of nutrition education-based interventions aimed at preventing stunting, particularly by improving maternal understanding of animal protein consumption among toddlers. The findings are expected to provide evidence for healthcare workers in designing more specific and effective nutrition education programs for mothers of children under five.

Therefore, this study aimed to analyze the role of maternal knowledge about animal protein in the incidence of stunting among toddlers in Sadananya Village, Sadananya Sub-district, Ciamis Regency. The hypothesis of this study was that there is a significant relationship between maternal knowledge about animal protein and the incidence of stunting among toddlers

METHOD

The design used in this study was a correlational study with a cross-sectional approach. This study focused on identifying the relationship between maternal knowledge about animal protein and the incidence of stunting among toddlers in Sadananya Village, Sadananya Sub-district, Ciamis Regency.

This study applied a purposive sampling technique as the sampling method, which involved selecting samples intentionally based on specific criteria to ensure that the selected participants were relevant to the research objectives. The calculation results showed that the respondents in this study consisted of 65 mothers who had toddlers aged 24–59 months in Sadananya Village, Sadananya Sub-district, Ciamis Regency.

The instrument used in this study was a maternal knowledge questionnaire regarding animal protein consisting of 34 questions. For measuring the incidence of stunting among toddlers, the researchers conducted height measurements using a microtoise measuring instrument.

This study was conducted in Sadananya Village, Sadananya Sub-district, Ciamis Regency. The data analysis techniques used included editing, coding, tabulating, data entry, and data cleaning using SPSS software version 24

RESULTS AND DISCUSSION

Respondent Characteristics

a. Demographic Characteristics Based on Maternal Age

Table 1
Frequency Distribution of Respondents Based on Age

No	Age	F	%
1	Young (<27 years)	20	30.8
2	Productive Adult (27–34 years)	33	50.8
3	Risk Age (>34 years)	12	18.5
Total		65	100

Based on Table 1, the majority of respondents were in the productive adult age group (27–34 years), accounting for 33 respondents (50.8%). Nearly one-third of respondents were in the young age group (<27 years), with 20 respondents (30.8%), while a small proportion were in the risk age group (>34 years), with 12 respondents (18.5%).

b. Demographic Characteristics Based on Toddler Gender

Table 2
Frequency Distribution Based on Toddler Gender

No	Gender	F	%
1	Male	27	41.5
2	Female	38	58.5
Total		65	100

Based on Table 2, the majority of toddlers were female, totaling 38 children (58.5%), while 27 toddlers (41.5%) were male.

c. Demographic Characteristics Based on Maternal Education

Table 3
Frequency Distribution Based on Maternal Education

No	Education Level	F	%
1	Low (Elementary School)	19	29.2
2	Middle (Junior and Senior High School)	43	66.2
3	Higher Education (Bachelor's and Master's Degree)	3	4.6
Total		65	100

Based on Table 3, most respondents had a middle level of education (junior and senior high school), totaling 43 respondents (66.2%). Nearly one-third of respondents had a low educational level (elementary school), with 19 respondents (29.2%), while only a small proportion had higher education, with 3 respondents (4.6%).

2. Univariate Analysis

a. Frequency Distribution of Maternal Knowledge about Animal Protein

Table 4
Frequency Distribution of Maternal Knowledge about Animal Protein

No	Category	F	%
1	Good	35	53.8
2	Moderate	9	13.8
3	Poor	21	32.3
Total		65	100

Based on Table 4, the majority of respondents had good knowledge regarding animal protein, accounting for 35 respondents (53.8%). Nearly one-third had poor knowledge, with 21 respondents (32.3%), while only a small proportion had moderate knowledge, with 9 respondents (13.8%).

b. Frequency Distribution of Stunting Incidence among Toddlers

Table 5
Frequency Distribution of Stunting Incidence among Toddlers

No	Category	F	%
1	Severely Stunted	2	3.1
2	Stunted	18	27.7
3	Normal	45	69.2
4	Tall	0	0
Total		65	100

Based on Table 5, most respondents had toddlers with normal height status, totaling 45 children (69.2%). Nearly one-third had stunted toddlers, totaling 18 children (27.7%), while a small proportion had severely stunted toddlers, totaling 2 children (3.1%). No toddlers were categorized as tall.

3. Bivariate Analysis

Relationship between Maternal Knowledge about Animal Protein and Stunting Incidence among Toddlers

Table 6
Relationship between Maternal Knowledge about Animal Protein and Stunting Incidence among Toddlers in Sadananya Village, Sadananya Sub-district, Ciamis Regency, 2025

Maternal Knowledge	Severely Stunted F (%)	Stunted F (%)	Normal F (%)	Tall F (%)	Total F (%)	p-value
Good	0 (0)	1 (2.9)	34 (97.1)	0 (0)	35 (53.8)	0.000
Moderate	0 (0)	1 (11.1)	8 (88.9)	0 (0)	9 (13.8)	
Poor	2 (9.5)	16 (76.2)	3 (14.3)	0 (0)	21 (32.3)	
Total	2 (3.1)	18 (27.7)	45 (69.2)	0 (0)	65 (100)	

Based on Table 6, among 35 respondents (53.8%) with good knowledge, almost all had toddlers with normal height status, totaling 34 children (97.1%), while only 1 toddler (2.9%) was categorized as stunted. No toddlers in this group were categorized as severely stunted or tall.

Among 9 respondents (13.8%) with moderate knowledge, most had toddlers with normal height status, totaling 8 children (88.9%), while 1 toddler (11.1%) was categorized as stunted.

Meanwhile, among 21 respondents (32.3%) with poor knowledge, most had stunted toddlers, totaling 16 children (76.2%). A small proportion had severely stunted toddlers, totaling 2 children (9.5%), and only 3 respondents (14.3%) had toddlers with normal height status.

The Spearman Rank correlation test showed a p-value of 0.000 ($p < 0.05$), indicating that H1 was accepted. This finding demonstrates a significant relationship between maternal knowledge about animal protein and the incidence of stunting among toddlers.

The correlation coefficient value of -0.766 indicated a strong negative correlation. This means that the higher the maternal knowledge about animal protein, the lower the risk of stunting among toddlers.

Discussion

1. Maternal Knowledge about Animal Protein in Sadananya Village

The findings revealed that the majority of respondents had good knowledge regarding animal protein. This condition indicates that mothers understood the importance of animal protein consumption for toddler growth and development, particularly in preventing stunting. Such knowledge was supported by regular health education activities conducted at **Posyandu** through counseling, nutritional education, and educational media such as health posters.

These findings are consistent with the study conducted by Silvia Salsabila (2020), which reported that most mothers had good nutritional knowledge and that maternal nutritional knowledge was associated with stunting incidence. However, the present study specifically focused on maternal knowledge regarding animal protein as an essential component of child nutrition, thereby contributing new insights into stunting risk factors.

Maternal education level also influenced knowledge. Most respondents had a middle educational level (junior and senior high school), enabling them to better understand health and nutrition information. This finding is in line with the theory proposed by Soekidjo Notoatmodjo (2014), which states that education affects an individual's ability to receive and understand information.

Age was another factor influencing maternal knowledge. Most mothers were in the productive adult age group (27–34 years), making them more active in community health activities and more receptive to health-related information. According to Notoatmodjo (2014), age is associated with cognitive maturity, information processing ability, and life experience.

Based on these findings, the researchers argue that maternal knowledge regarding animal protein is an important factor in preventing stunting. Adequate knowledge enables mothers to select nutritious foods appropriate to their children's needs, thereby supporting optimal growth and development.

2. Stunting Incidence among Toddlers in Sadananya Village

The findings showed that most toddlers had normal height status. This indicates that the majority of mothers were able to meet their children's nutritional needs adequately. However, the presence of stunted and severely stunted toddlers suggests that stunting remains a public health concern in the study area.

Stunting affects not only physical growth but also cognitive development, learning ability, and future productivity. Oktariana (2018) stated that stunting occurring during the first 1,000 days of life may result in long-term growth impairment.

The present findings demonstrate that nutritional education and maternal involvement in primary healthcare services such as *Posyandu* play important roles in stunting prevention. World Health Organization (2020) reported that family involvement, especially maternal participation in primary healthcare services, significantly contributes to the success of nutritional interventions and child growth outcomes.

Furthermore, this study suggests that education regarding animal protein consumption still needs to be strengthened, as some respondents continued to have stunted toddlers despite access to healthcare services. This finding differs from several previous studies that primarily emphasized economic and sanitation factors as the main determinants of stunting. The researchers assume that maternal understanding of the importance of animal protein is one of the determining factors in fulfilling toddlers' nutritional needs and preventing stunting.

3. Relationship between Maternal Knowledge about Animal Protein and Stunting Incidence among Toddlers in Sadananya Village

The results demonstrated a significant relationship between maternal knowledge about animal protein and stunting incidence among toddlers. The p-value of 0.000 and correlation coefficient of -0.766 indicated a strong negative correlation, meaning that better maternal knowledge about animal protein was associated with a lower risk of stunting among toddlers.

These findings support the Precede-Proceed theory proposed by Lawrence W. Green (1980), which states that knowledge is a predisposing factor influencing health behavior. In this context, maternal knowledge affects feeding practices and nutritional fulfillment among children.

The findings are also consistent with the study by Aprilina et al. (2021), which reported that maternal knowledge regarding animal protein was significantly associated with the practice of providing animal protein-based foods to toddlers. However, this study contributes additional evidence by demonstrating that maternal knowledge not only affects feeding practices but is also directly associated with stunting status.

According to Wahyuningsih et al. (2021), animal protein contains complete essential amino acids necessary for tissue formation and linear growth in children. Therefore, adequate animal protein intake is considered an important strategy for stunting prevention.

In addition, the findings of Haryani et al. (2023) revealed that children with adequate animal protein intake had a lower risk of stunting compared to those with insufficient intake. The present study strengthens these findings by emphasizing maternal knowledge as an important determinant of adequate animal protein intake among toddlers.

Based on the KAP (*Knowledge, Attitude, Practice*) theory proposed by Notoatmodjo (2003), behavioral change begins with knowledge, develops into attitudes, and is ultimately reflected in practice. In this study, mothers with good knowledge were more capable of implementing appropriate feeding practices for their children.

The researchers conclude that maternal knowledge regarding animal protein is an essential factor in stunting prevention. Better maternal knowledge increases mothers' ability to select and provide nutritious foods, particularly animal protein sources, thereby minimizing the risk of stunting among toddlers.

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusion

Based on the findings of this study on the relationship between maternal knowledge about animal protein and the incidence of stunting among toddlers in Sadananya Village, Sadananya Sub-district, Ciamis Regency, in 2025, it can be concluded that most mothers had good knowledge regarding animal protein. In addition, most toddlers had normal height status. The analysis showed a significant relationship between maternal knowledge about animal protein and the incidence of stunting among toddlers, with a p-value of 0.000 ($p < 0.05$). The better the mother's knowledge regarding animal protein, the lower the risk of stunting among toddlers. These findings indicate that maternal knowledge is an important factor in stunting prevention through optimal nutritional fulfillment, particularly adequate animal protein intake.

2. Recommendations

Healthcare institutions, such as public health centers and *Posyandu*, are encouraged to strengthen nutrition education programs regarding the importance of animal protein in preventing stunting. Educational institutions are expected to use this study as a reference for learning and future research related to child nutrition and stunting prevention.

Parents, especially mothers, are encouraged to improve their understanding of balanced nutrition and actively participate in *Posyandu* activities to monitor child growth regularly. Future researchers are recommended to explore other factors influencing stunting, including socioeconomic conditions, parenting patterns, and access to healthcare services.

Village authorities and healthcare workers, particularly nurses, are expected to enhance community-based nutrition education and promote the utilization of local animal protein sources as part of sustainable stunting prevention efforts

ETHICAL CONSIDERATIONS

The authors did not receive support from any organization for the submitted work

CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest regarding the publication of this study

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