# Multifactorial Determinants of Stunting among Under-Five Children in Tambun Tulang Village, South Coastal District, Indonesia

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**Abstract:** *Background*: Stunting is a chronic condition of impaired growth in children under five, primarily due to long-term malnutrition. It is identified using the height-for-age (TB/U) indicator, where a Z-score below -2 standard deviations (SD) from the WHO child growth standards signifies stunting. In Kenagarian IV Koto Hilie, 53 children (8.32%) were recorded as stunted. Although malnutrition can begin during pregnancy or shortly after birth, it often becomes evident when the child reaches two years of age.

*Objective*: This study aimed to identify the factors influencing the incidence of stunting among toddlers in Kampung Bukit Tambun Tulang**.**

*Methods*: A quantitative, cross-sectional study design was employed. The population consisted of 173 toddlers, with a sample of 63 selected through simple random sampling. Primary data were collected via structured interviews using questionnaires, and secondary data were sourced from Kenagarian IV Koto Hilie health reports. Data analysis included univariate and bivariate methods, with the chi-square test employed to identify associations.

*Results*: The study found that 57.1% of the sampled toddlers were stunted. Bivariate analysis revealed significant relationships between stunting and maternal knowledge ($p = 0.003$), family income ($p = 0.022$), and nutritious food intake ($p = 0.016$).

*Conclusion*: Stunting is closely linked to maternal education, socioeconomic conditions, and child nutrition. Health workers should provide targeted education to promote behavioral change and improve parenting practices. Structured family coaching is recommended to support nutritional fulfillment and prevent stunting during early childhood development.

**Keywords:** Stunting, maternal knowledge, family income, nutritious food intake, toddlers.

## INTRODUCTION

Suboptimal growth in the womb caused by maternal Nutritional consumption during gestation and the first 1000 days of life (1000 HPK) period is a critical node as the beginning of stunting. Stunting in toddlers not only has an impact on a shorter physique but can also increase the risk of morbidity and mortality, as well as impaired neurological development, compromised motor skills, and hindered cognitive growth in children [1].

In 2020, approximately 149.2 million children, or about 22.0% of toddlers globally, were affected by stunting. This represents a decline from 2017, when the prevalence was 36.4%. However, the reduction in the rate of stunting in children under five is still far from meeting the World Health Assembly's goal of a 40% reduction by 2025.Regionally, 53% of stunted toddlers in 2020 resided in Asia, with more than 2 out of 11% of these cases occurring in Southeast Asia (Helmizar, 2020). The Ministry of Health of the Republic of Indonesia reported a national reduction in the stunting rate by 1.6%, resulting in a prevalence of 27.67% in 2019. It is anticipated that the prevalence of stunting in Indonesia will decrease to 26.9% in 2020 and further to 24.4% in 2021 [2].

West Sumatra Province has seen progress with a reduction in stunting rates over the years. In 2019, the stunting prevalence was 27.5%, which slightly decreased to 26.71% in 2020, and further dropped to 23.3% among children under five in 2021. By 2023, the areas in West Sumatra with the highest rates of stunted children under five were West Pasaman Regency at 35.5%, Mentawai Islands Regency at 32%, South Solok Regency at 31.7%, Sijunjung Regency at 30%, and South Pesisir Regency at 29.8%.

Stunting cases in Pesisir Selatan District increased from 25.2% in 2022 to 29.8% in 2023, with a total of 2,314 cases. Batang Kapas, the subdistrict, is characterized by a significantly high prevalence of stunting, with a recorded rate of 7.81%, within the South Pesisir Regency, with a high incidence of

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stunting in Kenagarian IV Koto Hilie, namely 53 people (8.32%). (Kuok Market Health Center Profile Year 2024)

The root of the stunting problem is the inadequate quality of Human Resources (HR), as well as economic and socio-cultural crises, which cause food shortages, poor parenting, and environmental issues, both in terms of sanitation and existing health services. The indirect factors for stunting are food intake due to the availability and access to food, due to the economic crisis, which can lead to low purchasing power. Inadequate parenting due to low parental knowledge and parental income. Infectious diseases also directly cause stunting [3, 4].

This research aligns with the theoretical framework proposed by UNICEF (2021) and the Indonesian Ministry of Health (2021), which outlines many factors that cause *stunting.* The direct causes of stunting are infectious disease factors and nutrient intake. This factor is influenced by nutritious food intake, exclusive breastfeeding, and sanitation, such as the availability of healthy latrines. The basic causes of *stunting* are at the individual and household levels, such as socio-cultural, quality of human resources, namely knowledge, and income.

This study corroborates the findings of [5] in the Equatorial Journal of Public Health, which indicate a significant association between exclusive breastfeeding, sanitation, and maternal knowledge.

The chi-square test results for the maternal knowledge variable in the bivariate analysis showed a p-value of 0.006 ($p < 0.05$) and an OR of 3.611. For the exclusive breastfeeding variable, the p-value was 0.0011 ($p < 0.05$) with an OR of 3.314. The basic sanitation variable had a p-value of 0.006 ($p < 0.05$) and an OR of 5.960, indicating that toddlers living in homes with inadequate basic sanitation are six times more likely to suffer from stunting compared to those in households with proper basic sanitation, after considering the effects of exclusive breastfeeding and maternal knowledge. The main factor linked to the prevalence of stunting in young children is the standard of basic sanitation, OR95%CI =5.960 (1.653-21.484).

Based on the above, it is necessary to research "Factors Affecting the Incidence of Stunting in Toddlers in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency in 2024?"

This study aims to identify the factors influencing the prevalence of stunting among toddlers in the village of Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency.

## METHODS

This study employs a quantitative methodology utilizing a cross-sectional design. The research was conducted in 2024 in the village of Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency. The study population comprised 173 toddlers, from which a sample of 63 toddlers was drawn.

The data in this study were collected through surveys. Primary data were obtained through field surveys by conducting face-to-face interviews with respondents (mothers or caregivers of toddlers) using a structured questionnaire that had been tested for validity and reliability. Secondary data were collected from the 2023 Annual Report of Kenagarian IV Koto Hilia and the 2023 Profile of the Pasar Kuok Community Health Center, which provide an overview of the health conditions of the community and stunting rates in the study area. The interviews were conducted by the researcher, assisted by cadres and health workers. The technique used for sample selection is *simple random sampling.* This study was analyzed using univariate and bivariate analyses using the SPSS application. The study was conducted by the researcher, assisted by cadres, health workers, and students. Anthropometric measurements were taken directly in the field by the researcher, assisted by cadres and health workers. Data from the anthropometric measurements (physical examinations) were also compared with data recorded by the cadres from the IV Koto Hilie Kenagarian Party (Nagari IV Koto Hilie Annual Report, 2023), Kuok Market Health Center Profile Year 2023.

In this study, knowledge about child nutrition is defined as the level of understanding of mothers or caregivers of toddlers regarding nutritional issues to help improve the nutritional status of children, to achieve growth maturity, and overcome stunting. A mother's knowledge is an essential factor because mothers are the primary decision-makers in providing daily meals for toddlers. A good level of knowledge among mothers is expected to encourage proper feeding patterns for children, thereby preventing stunting.

All collected data were processed through editing, coding, entry, and cleaning stages to ensure the accuracy of the information. Data analysis was performed univariately to describe the frequency distribution of each variable, and bivariately to assess the relationship between independent factors (including mothers' nutritional knowledge) and the incidence of stunting in toddlers. Data processing was performed using SPSS.

Data on the nutritional intake of children aged 6 months to 5 years were collected through structured interviews with mothers or caregivers of toddlers using a questionnaire. The questionnaire contained questions that explored daily feeding habits, reflecting the quality and quantity of children's nutritional intake.

This instrument assessed the extent to which children received a balanced diet that included various essential nutrient groups, namely carbohydrates, protein, fat, vitamins, and minerals. Each question in the questionnaire focused on the frequency of feeding with specific nutritional components. For example:

- Providing a balanced diet (rice, side dishes, vegetables, fruit, and milk) every day.
- Providing foods that contain fat (avocados, nuts, meat, fish, eggs, milk) every day.
- Providing foods that contain carbohydrates (rice, tubers, corn, flour) every day.
- Providing foods that contain protein (meat, fish, soybeans, eggs, nuts, milk) every day.
- Provide foods containing vitamins (fruits and vegetables) every day.

Respondents were asked to answer using a frequency scale, for example:

Always (every day) → score 3

Often (3–5 times/week) → score 2

Sometimes (1–2 times/week) → score 1

Never → score 0

The scores from all questions are then added up to obtain a total nutritional intake score. This total score is then categorized as:

Good → if the score is ≥ 76% of the maximum total score (the child receives a balanced diet regularly).

Fair → if the score is 56–75%.

Poor → if the score is ≤ 55%.

This method assesses not only the quantity of food consumed, but also its quality (diversity and nutritional balance). Thus, the nutritional intake variable is not only viewed from one type of food, but from the overall daily consumption pattern.

To improve data validity, researchers emphasize short-term recall (e.g., the last 24 hours or eating habits in the previous week) so that mothers/caregivers can more easily remember and accurately report their children's nutritional intake.

## RESULTS

The frequency distribution of toddlers based on nutritional status (TB/U) in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, Pesisir Selatan Regency is presented in Table **1**.

## CHARACTERISTICS OF RESPONDENTS

In the characteristics of respondents based on their latest education, it is known that (57.1%) of respondents have a high school education in Bukit Tambun Tulang Village, Kenagarian IV Koto Hilia, Batang Kapas District, Pesisir Selatan Regency in 2024.

In the characteristics of respondents based on occupation, it is known that (52.4%) of respondents have jobs as housewives (IRT) in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency, 2024.

Regarding the traits of respondents in relation to their family size, it is observed that44.9% of respondents have as many as 5 family members in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency, in 2024.

Researchers analyzed data on one toddler per family, selected randomly or based on specific criteria (typically the youngest toddler).

The unit of analysis in this study was toddlers, with the provision that only one toddler per family was

**Table 1: Frequency Distribution of Respondents Based on Respondent Characteristics**

| Characteristics of Respondents | Frequency | Percentage (%) |
|---|---|---|
| Last education | | |
| Elementary School | 3 | 4,8 |
| Junior High School | 17 | 27 |
| High School | 36 | 57,1 |
| College | 7 | 11,1 |
| Total | 63 | 100.0 |
| Occupation | | |
| Housewife | 33 | 52,4 |
| Trader | 23 | 36,5 |
| Farmer | 3 | 4,8 |
| Civil Servant | 4 | 6,3 |
| Total | 63 | 100.0 |
| Number of family members | | |
| 3 people | 10 | 15,9 |
| 4 People | 12 | 19 |
| 5 People | 22 | 34,9 |
| 6 People | 14 | 22,2 |
| 7 People | 5 | 7,9 |
| Total | 63 | 100.0 |
| Number of Toddlers | | |
| 1 Person | 38 | 60,3 |
| 2 People | 18 | 28,6 |
| 3 People | 3 | 4,8 |
| 4 People | 4 | 6,3 |
| Total | 63 | 100.0 |
| Gender | | |
| Male | 37 | 58,7 |
| Female | 26 | 41,3 |
| Total | 63 | 100.0 |

analyzed. If there was more than one toddler in a family, the researchers selected one toddler at random or based on specific criteria, namely, the youngest toddler in the family.

This approach was chosen to avoid duplication of family characteristics in the data, so that each observation analyzed was truly independent. Thus, family variables such as the mother's level of education, nutritional knowledge, income, and number of family members were not counted more than once for the same family.

The selection of the youngest toddler was considered because younger children tend to have different nutritional and health risks compared to older children, thus providing a more accurate picture of stunting in the early stages of growth and development.

Based on the number of toddlers, the characteristics of respondents reveal that 60.3% have several toddlers, with a maximum of 1 person in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency, in 2024.

In the characteristics of respondents based on gender, it is known that (58.7%) of toddlers are male gender in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Pesisir Regency in 2024.

## UNIVARIATE ANALYSIS

Table **2** below provides details on the rate of stunting observed in this study.

Based on the table above, it can be seen that more than half (57.1%) of toddlers experience stunting in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency in 2024. Most (60.3%) mothers of toddlers in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency, have good knowledge. In the study area of Bukit Tambun Tulang, Kenagarian IV Koto Hilia Village, Batang Kapas District, South Pesisir Regency, more than half of the respondents (54%) earned below the minimum wage, whereas 50.8% demonstrated a status of adequate nutritious food intake

## BIVARIATE ANALYSIS

Among the respondents, those with limited knowledge exhibited stunting in 20 individuals (80%), whereas those with adequate knowledge experienced stunting in 16 individuals (42.1%). The Chi-square test produced a p-value of 0.003 ($p < 0.05$), demonstrating a significant link between maternal knowledge and the

**Table 2: Frequency Distribution of Stunting Incidence in Bukit Tambun Tulang Kenagarian IV Koto Hilia Village, Batang Kapas District, South Coastal Regency**

| Variable | Frequency | Percentage |
|---|---|---|
| Stunting | | |
| Stunting | 36 | 57,1 |
| Not Stunting | 27 | 42,9 |
| Total | 63 | 100 |
| Maternal Knowledge | | |
| Poor | 25 | 39.7 |
| Good | 38 | 60.3 |
| Total | 63 | 100.0 |
| Family Income | | |
| Below minimum wage | 34 | 54 |
| Above the minimum wage | 29 | 46 |
| Total | 63 | 100.0 |
| Nutritious Food Intake | | |
| Less Nutritious | 31 | 49.2 |
| Nutritious | 32 | 50.8 |
| Total | 63 | 100.0 |

**Table 3: Relationship (Maternal Knowledge, Family Income, and Nutritious Food Intake) with the Incidence of Stunting in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency**

| Variable | Stunting | | Not stunting | | P |
|---|---|---|---|---|---|
| | f | % | f | % | |
| Maternal Knowledge | | | | | |
| Not good | 20 | 80 | 5 | 20 | 0.003 |
| Good | 16 | 42.1 | 22 | 57.9 | |
| Total | 36 | 57.1 | 27 | 42.9 | |
| Family Income | | | | | |
| Below the minimum wage | 15 | 44.1 | 19 | 55.9 | 0.022 |
| Above minimum wage | 21 | 72.4 | 8 | 27.6 | |
| Total | 36 | 57.1 | 27 | 42.9 | |
| Nutritious Food Intake | | | | | |
| Less Nutritious | 13 | 41.9 | 19 | 58.1 | 0.016 |
| Nutritious | 23 | 71.9 | 9 | 28.1 | |
| Total | 36 | 57.1 | 27 | 42.9 | |

occurrence of stunting in young children. Furthermore, respondents with an income below the minimum wage showed stunting in 15 individuals (44.1%), while those with an income above the minimum wage exhibited stunting in 21 individuals (72.4%). The Chi-square test results indicated a p-value of 0.022 ($p < 0.05$), indicating a notable connection between household income and the prevalence of stunting among young children. Additionally, respondents with inadequate nutritional intake experienced stunting in 13 individuals (41.9%), compared to those with adequate dietary intake, who experienced stunting in 23 individuals (71.9%). The Chi-square statistical test produced a p-value of 0.016 ($p < 0.05$), confirming a significant association between nutritional intake and the incidence of stunting in toddlers.

## DISCUSSION

### 1. Univariate Analysis

#### *a. Incidence of Stunting*

Analysis of the study's findings reveals that among the 63 respondents, 57.1% were toddlers experiencing *stunting* and 42.9% were not *stunted* in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency. This study aligns with the findings of Purnama AL, Hasanuddin, and Sulaeman S (2021), which reported that among the 12 respondents (30%) who experienced stunting, 28 respondents (70%) did not experience stunting. So**,** most children do not experience stunting. Stunting is a condition observed in young children, marked by a nutritional status that is below the standard norms.

The assessment of this condition is conducted using the length or height-for-age metric (TB/U). A z-score that falls below negative two standard deviations (<-2 SD) indicates the condition's presence. Moreover, when the z-score is less than negative three standard deviations (< -3 SD), toddlers are considered to be very [6].

Stunting is a growth disorder that arises from chronic malnutrition, developing over an extended period due to insufficient food intake. This condition, which can start during pregnancy, becomes noticeable when the child turns two years old, as it affects their nutritional requirements. If stunting is not accompanied by catch-up growth, it can cause a slowdown in growth and become a public health problem because it risks increasing morbidity, mortality, and inhibiting children's motor and mental development [7]

#### *b. Maternal Knowledge about Nutrition*

The results showed that most (60.3%) mothers of toddlers had good knowledge, and (39.7%) had poor knowledge in Kampung Bukit Tambun Tulang Kenagarian IV Koto Hilia, Batang Kapas District, South Coastal Regency. The findings of this study align with the research conducted by Purnama, Hasanuddin, and Sulaeman S (2021), which found that among 40 respondents, 18 individuals (45%) demonstrated good knowledge, 14 respondents (35%) exhibited sufficient knowledge, and 8 respondents (20%) possessed poor knowledge. In conclusion, it can be deduced that most mothers have a significant understanding of how common stunting is [8].

Increasing maternal knowledge and providing proper parenting to children under five play an essential role in overcoming *stunting*. Mothers must possess comprehensive knowledge and the capability to provide adequate nutrition through the careful selection and preparation of food ingredients. This ensures that children's dietary intake is secure and contributes to the enhancement of their nutritional status, thereby facilitating optimal growth and development. One of the determinants influencing nutritional status is the interplay between socioeconomic status and nutritional outcomes [9].

Based on the researchers' analysis, the findings indicated that over fifty percent of parents possessed substantial knowledge regarding stunting. First Level Health Facilities (FKTP) are anticipated to actively contribute to the reduction of stunting rates through targeted nutritional interventions, especially during the vital phase of the initial 1,000 days of life until the child turns six years old. The successful implementation of this program necessitates effective collaboration among various stakeholders and parents. Furthermore, maternal behavior in maintaining toddler health is significantly influenced by the level of knowledge, which is shaped by information acquired from the surrounding environment, mass media, social media, community health workers, and healthcare professionals. A crucial measure to enhance maternal knowledge involves conducting socialization or counseling activities about stunting and its prevention, facilitated by both health institutions and community health workers.

#### *c. Family Income*

It is known that most (54%) respondents have incomes below the minimum wage. As many as 50.8%

of respondents have a nutritious food intake status in Bukit Tambun Tulang Kenagarian IV Koto Hilia Village, Batang Kapas Subdistrict, South Pesisir Regency.

This study corroborates the research conducted by Dewi and Ariani (2022, which identified that most mothers of toddlers had high incomes (above the minimum wage), with 93 individuals (77.5%) in this category, compared to 27 individuals (22.5%) with low incomes (below the minimum wage) [10]. Socioeconomic factors are recognized as influential in determining the nutritional status of toddlers, with low socioeconomic status significantly increasing the risk of stunting in children, as it affects the family's capacity to meet dietary requirements [11]. Socioeconomic status is affected considerably by family income levels. When household access to food is compromised, particularly due to poverty, the likelihood of malnutrition issues, including stunting, increases [12].

Based on the researcher's analysis, the results showed that most parents of toddlers had incomes below the minimum wage. Economic status significantly affects nutritional status in toddlers. Limited income in the family leads to the inability of households to meet their food needs, which in turn has an impact on insufficient nutritional intake necessary for child growth. It is advisable for healthcare professionals to actively engage in offering support and assistance to mothers of toddlers in efforts to modify childcare-related behaviors, especially in providing nutritious food and adjusting to family track income by consistently observing the progress and growth of children under the age of five.

***d. Nutritious Food Intake***

The results showed that as many as 50.8% of respondents had a nutritious food intake status. In comparison, 49.2% had a less nutritious food intake status in Kampung Bukit Tambun Tulang Kenagarian IV, Koto Hilia, Batang Kapas District, South Coastal Regency.This study aligns with the research conducted by Wibowo *et al*. (2023), which involved 149 respondents. Among these, 76 respondents (51.0%) were not aware of nutritional information, while 73 respondents (49.0%) exhibited nutrition-conscious behavior. Ensuring balanced nutrition constitutes a critical component in addressing stunting among toddlers. Adequate and balanced food intake is essential to support the optimal growth and developmental processes in young children. Mothers, as primary caregivers, play a pivotal role in determining the types of food consumed by their children and other family members [13].

A child is categorized as stunted if they experience growth disorders characterized by lower height than children of the same age who grow normally. This condition typically arises from insufficient nutritional intake over an extended duration. One of the factors that contribute to stunting is inadequate energy intake from pregnancy through early childhood. Therefore, efforts are needed to improve nutritional status through improved food consumption patterns. Nutritional adequacy and balance during the golden period of growth are key factors in the success of child development [14].

Based on the researcher's analysis, the results showed that (50.8%) of toddlers had nutritious food intake. It is recommended that parents pay more attention and improve nutritional parenting behavior in toddlers through family coaching provided by health workers to prevent stunting in the future due to parenting patterns that do not support the application of balanced nutrition.

**2. Bivariate Analysis**

***a. The Correlation between Maternal Knowledge and the Prevalence of Stunting***

According to the results of the Chi-Square statistical test, the P-value is 0.003 ($\rho < 0.05$), indicating a significant relationship between maternal knowledge about nutrition and the incidence of stunting. This finding aligns with previous research(Darmini *et al*., 2022) The study titled "The Relationship between Maternal Knowledge Level About Balanced Nutrition and the Incidence of Stunting in Toddlers Aged 2-5 Years at the Kintamani V Health Center" demonstrates that the results of the chi-square statistical test yielded a p-value of 0.000, which is less than the significance level $\alpha$ of 0.05 [15]. This indicates a significant relationship between the level of maternal knowledge regarding balanced nutrition and the incidence of stunting in toddlers.

Parental knowledge is crucial in enhancing children's nutritional status, thereby facilitating optimal growth and development. A deficiency in knowledge, coupled with a limited understanding of healthy dietary practices and stunting, can influence maternal attitudes and behaviors in food provision for children, affecting both the type and quantity necessary to support optimal child growth and development.

The enhancement of knowledge is influenced by information obtained from the environment, mass media, social media, community health workers, and healthcare professionals. It is anticipated that mothers with sound nutritional knowledge will be better equipped to provide food types and portions appropriate to the developmental stage of toddlers, thereby ensuring optimal growth and preventing growth disorders.

### *b. The Correlation between Family Income and Stunting Incidence in the Pauh Duo Health Center Service Area, South Solok Regency*

According to the results of the Chi-Square statistical test, the P-value is 0.022 (ρ < 0.05), indicating a significant relationship between family income and the incidence of stunting. This finding is consistent with previous research (Akbar & Mauliadi Ramli, 2022), which states that the family income factor yielded a value (OR = 2.602; 95% CI, 1.095-6.184; p = 0.044). This means that with less family income 2.602 times the risk of their children being stunted is greater than in families who have sufficient income. In addition, the OR value = 2.602 (OR> 1). Family income is identified as a risk factor for stunting. Families with lower income levels are at a greater risk of having children who experience stunting compared to families with sufficient or higher income levels [16].

The findings of this study corroborate the research conducted by Hana Ilmi and her colleagues, which identified a correlation between parental income levels and the prevalence of stunting. Specifically, children from low-income families are 7.8 times more likely to experience stunting compared to their counterparts from high-income families. The economic constraints faced by these families can adversely affect both the quality and quantity of food consumed. Such limitations significantly increase the risk of stunting among children under the age of five. Furthermore, low income and diminished purchasing power often compel families to adopt dietary practices that do not adequately support the enhancement of nutritional status, particularly in children [17].

Low income diminishes household purchasing power for food, thereby impacting the availability of essential nutrients for toddlers. This can result in inadequate fulfillment of toddlers' nutritional requirements. Likewise, on the other hand, sufficient family income is more likely to fulfill nutritious food needs so that children can avoid stunting.

Researchers provide little education that fulfilling nutritious food intake does not have to come from meat but can be adjusted to the income of each family, which can be obtained easily, and of course, can be reached by ordinary people in general, such as eggs, green vegetables, carrots, and others.

### *c. The Relationship between Nutritious Food Intake and the Incidence of Stunting in the Pauh Duo Health Center Working Area, South Solok Regency*

The Chi-Square statistical test yielded a P-value of 0.016 (ρ < 0.05), indicating a significant association between the intake of nutritious food and the incidence of stunting in toddlers. This finding is consistent with previous research (Hidayat & Rohani, 2022). The analysis indicates a significant association between energy intake and the incidence of stunting in children under five years of age, with a p-value of 0.004 (p < 0.05). Additionally, there is a significant relationship between protein intake and the incidence of stunting in this demographic, with a p-value of 0.012 (p < 0.05) [18].

Wardita *et al*. (2021) found that toddlers with poor diets are 3.16 times more likely to suffer from stunting. Ensuring a balanced diet is essential for achieving optimal nutritional health, promoting growth, maintaining bodily functions, and boosting productivity. As a result, a healthier diet decreases the chances of developing health issues, including nutritional problems like stunting [19].

Nutritional parenting is a form of parenting practice that mothers employ towards their children, encompassing food consumption habits, presentation methods, food safety, and daily eating behaviors. The nutritional status of children under the age of five may be adversely impacted by inadequate nutritional parenting, particularly when such deficiencies persist over an extended period.

Inappropriate parenting generally occurs because mothers pay less attention to the adequacy of children's nutritional intake and are less careful in feeding according to children's needs [20]. Food intake reflects the amount of nutrients consumed. Insufficient intake is among the multifaceted factors contributing to stunting in toddlers. It is crucial to select the appropriate type of food to aid in the growth and development of toddlers, as their diet is a direct factor influencing the risk of stunting.

## LIMITATION

This study has several limitations, namely:

1. The respondents' level of formal education and economic conditions were not consistent. More than 50% of respondents had at least a high school diploma, but at the same time, more than 50% of respondents also had incomes below the regional minimum wage. This shows that a relatively high level of formal education does not directly reflect better economic conditions in the community. Based on local conditions, this is influenced by limited job opportunities in the study area or the types of jobs available, which are not always in line with the respondents' educational levels.

2. The difference between the level of formal education and the nutritional knowledge possessed by mothers. The percentage of mothers with good nutritional understanding is higher than the proportion of respondents with higher formal education. This can be explained by the fact that nutritional knowledge is not only obtained through formal education, but also through health information sources in the research location, such as health education provided by cadres and health workers at the Posyandu, health promotion media such as banners, posters, and leaflets, and social interactions in the community. This condition shows that health education interventions can play an essential role in increasing mothers' knowledge about child nutrition, even if their formal education level is limited.

Number of family members: The data obtained does not classify family composition in detail. The available information is still general, without distinguishing between nuclear families (parents with children) and extended families (parents with children and grandparents or other family members living together). This has the potential to affect the interpretation of the results, because the number and composition of family members can influence the distribution of resources, parenting patterns, and the quality of care received by toddlers.

Further research with more detailed classifications related to variables such as education, income, nutritional knowledge, and family composition is highly desirable to provide a more comprehensive picture of the factors that influence the incidence of stunting in toddlers.

## CONCLUSION

Upon analyzing the study's results, it is evident that there is a significant association between maternal knowledge (p-value = 0.003), family income (p-value = 0.022), and nutritious food intake (p-value = 0.016) with the incidence of stunting among toddlers in Kampung Bukit Tambun Tulang, Kenagarian IV Koto Hilia, District Batang Kapas, Pesisir Selatan Regency.

## CONFLICT OF INTEREST

The authors have no conflict of interest to declare

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The authors would like to thank all the participants in the study for their collaboration and insights. Additionally, this article was proofread using the Paperpal application to improve the quality of the English language. However, all research content, including data analysis and interpretation, was conducted independently without the use of AI tools.

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