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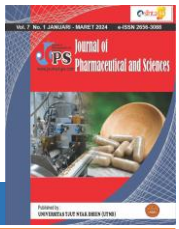

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# The Relationship of Knowledge, Parenting Patterns, Feeding, and Environmental Sanitation to the Incidence of Stunting in Toddler Ages 24-59 Months in the Working Area of the Buhit Puskesmas, Samosir District, 2025

# Hubungan Pengetahuan, Pola Asuh Pemberian Makan Dan Sanitasi Lingkungan Terhadap Kejadian Stunting Balita Usia 24-59 Bulan Di Wilayah Kerja Puskesmas Buhit Kabupaten Samosir Tahun 2025

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## Abstract

**Background:** Stunting is a chronic nutritional problem with profound implications for the quality of human resources. Multiple factors, including parental knowledge, feeding practices, and environmental sanitation, influence this condition. The working area of the Buhit Community Health Center (Puskesmas Buhit) in Samosir Regency continues to face challenges in addressing stunting, making the identification of dominant factors essential for targeted interventions. **Objective:** This study aims to analyze the relationship between parental knowledge, feeding practices, and environmental sanitation with the incidence of stunting among children aged 24–59 months, and to identify the most influential factor in the Buhit Community Health Center service area, Samosir Regency, in 2025. **Methods:** This research employed an observational analytic design with a cross-sectional approach. The study population comprised all children aged 24–59 months (n = 577). A total of 88 respondents were selected using simple random sampling and the Slovin formula. Data were collected through questionnaires and anthropometric measurements, and analyzed using Chi-square tests and logistic regression. **Results:** Bivariate analysis revealed a significant association between parental knowledge (p = 0.000), feeding practices (p = 0.000), and environmental sanitation (p = 0.004) and the incidence of stunting. Multivariate analysis revealed that feeding practices were the most dominant factor (OR = 105.463; 95% CI = 13.888–800.848). This indicates that children with inadequate feeding practices have a 105.463-fold higher risk of stunting compared to those with good feeding practices. **Conclusion:** A significant relationship exists between parental knowledge, feeding practices, environmental sanitation, and the incidence of stunting. The most dominant factor is feeding practices. Therefore, stunting prevention interventions in this area should focus on improving parents' understanding and implementation of appropriate feeding practices.

***Keywords*: *Knowledge, Parenting Patterns for Child Feeding, Health Environment, and Stunting.***

## Abstrak

**Latar Belakang:** Stunting merupakan masalah gizi kronis yang berdampak serius pada kualitas sumber daya manusia. Kondisi ini dipengaruhi oleh faktor multidimensi, termasuk pengetahuan orang tua, pola asuh pemberian makan, dan kondisi sanitasi lingkungan. Wilayah Kerja Puskesmas Buhit di Kabupaten Samosir masih menghadapi tantangan dalam penanganan stunting, sehingga identifikasi faktor dominan sangat diperlukan untuk intervensi yang tepat sasaran. **Tujuan:** Penelitian ini bertujuan untuk menganalisis hubungan antara pengetahuan orang tua, pola asuh pemberian makan, dan sanitasi lingkungan dengan kejadian stunting pada balita usia 24-59 bulan, serta mengidentifikasi faktor yang paling dominan pengaruhnya di Wilayah Kerja Puskesmas Buhit, Kabupaten Samosir tahun 2025. **Metode:** Jenis penelitian ini adalah analitik observasional dengan pendekatan *cross-sectional*. Populasi penelitian adalah seluruh balita (24-

59 bulan) berjumlah 577 orang. Sampel diambil sebanyak 88 responden menggunakan teknik *simple random sampling* dan rumus Slovin. Data dikumpulkan melalui kuesioner dan pengukuran antropometri, kemudian dianalisis menggunakan uji Chi-square dan regresi logistik. **Hasil:** Hasil analisis bivariate menunjukkan adanya hubungan yang signifikan antara pengetahuan (p=0,000), pola asuh pemberian makan (p=0,000), dan sanitasi lingkungan (p=0,004) dengan kejadian stunting. Analisis multivariate mengungkapkan bahwa **pola asuh pemberian makan** merupakan faktor paling dominan (OR=105,463; 95% CI=13,888–800,848). Artinya, balita dengan pola asuh pemberian makan yang kurang baik memiliki risiko 105,463 kali lebih tinggi untuk mengalami stunting dibandingkan dengan yang pola asuhnya baik. **Kesimpulan:** Terdapat hubungan signifikan antara pengetahuan, pola asuh pemberian makan, dan sanitasi lingkungan dengan kejadian stunting. Faktor yang paling dominan adalah pola asuh pemberian makan. Oleh karena itu, intervensi pencegahan stunting di wilayah ini perlu difokuskan pada peningkatan pemahaman dan praktik pola asuh pemberian makan yang baik kepada orang tua.

***Kata Kunci:*** *Pengetahuan, Pola Asuh Pemberian Makan Anak, Kesehatan Lingkungan Dan Stunting.*



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## Introduction

Stunting, characterized by stunted growth and development in children due to chronic malnutrition and recurrent infections, remains a critical public health challenge globally. [1]. This condition, indicated by a height-for-age (H/A) z-score below -2 standard deviations, often begins in utero and during the first two years of life, a period known as the critical "First 1000 Days of Life" [2,3]. The impacts of stunting extend beyond short stature, resulting in increased morbidity, suboptimal cognitive development, reduced learning capacity, and lower economic productivity in adulthood, thereby threatening the quality of a nation's human resources [4].

Globally, the prevalence of stunting is high, particularly in Asia. In Indonesia, although there has been a national decline from 30.8% in 2018 to 21.5% in 2023, the figure remains above the World Health Organization (WHO) target of 20% [5,6]. This pattern is also evident in Samosir Regency, North Sumatra, where the prevalence of stunting decreased from 28.4% in 2021 to 22.4% in 2023, but still exceeds the WHO target. Notably, the Buhit Community Health Center (Puskesmas) reported 154 cases of stunting in 2023, indicating a persistent local problem that requires targeted intervention.

Stunting is a multifactorial problem influenced by the interaction of direct, indirect, and underlying causes. Key determinants include maternal knowledge, child feeding practices, and environmental sanitation [7]. Adequate parental understanding is crucial for proper parenting and feeding practices. Meanwhile, improper parenting and feeding practices can directly lead to inadequate nutritional intake. Furthermore, poor environmental sanitation, including limited access to clean water and improper waste disposal, increases the risk of recurrent infections such as diarrhea, which interfere with nutrient absorption and utilization, thereby exacerbating the risk of stunting [8].

Although various studies have examined the relationship between each of these factors and stunting, comprehensive analyses comparing the simultaneous contribution of all three aspects in a specific regional context, such as the Buhit Community Health Center, are still limited. Initial findings indicate that the majority of mothers of stunted children in this region have low knowledge about stunting. Still, it is not yet known which factor is the most dominant influence. Based on this, this study aims to analyze the relationship between

parental knowledge, child feeding patterns, and environmental sanitation with the incidence of stunting in children aged 24-59 months in the Buhit Community Health Center working area, and to identify the most dominant factors contributing to stunting in the region.

## Experimental Section

### Research Design

This research employed quantitative research methods. Quantitative research is a research method used to examine a specific population or sample by collecting data using research instruments. The data analysis is quantitative in nature, aimed at testing a predetermined hypothesis [9].

This research is a correlation analytical study with a cross-sectional approach, where data for the dependent and independent variables are collected simultaneously. This design is intended to study the dynamics and variations of the variables contained in the research title, namely the Relationship between Knowledge, Parenting Patterns, Feeding, and Environmental Sanitation to the incidence of stunting in toddlers aged 24-59 months in the working area of the Buhit Community Health Center, Samosir Regency, in 2025.

### Population and Sample.

The population in this study consisted of all mothers with toddlers aged 24–59 months in the Buhit Community Health Center (Puskesmas) working area, Pangururan District, totaling 577 individuals. The sample size was determined using the Slovin formula, with a 10% error rate, resulting in a sample of 88 respondents. The sample was selected using a simple random sampling technique, in which each member of the population has an equal chance of being selected through a drawing process [9,10].

### Measurement Aspects

The measurement aspect in this study includes several variables. The variable of stunting incidence is determined based on the measurement of the height of toddlers aged 24–59 months. Then, the nutritional status is calculated using the z-score of height for age (H/A). Toddlers with a z-score < –2 SD are categorized as stunted (score 0), while toddlers with a z-score > –2 SD are categorized as not stunted (score 1), with an ordinal measurement scale. The variable of maternal knowledge is measured using a questionnaire containing 10 questions, with correct answers (score 1) and incorrect answers (score 0). The measurement results are then categorized as poor if the score is ≤ 50% (≤ 5) and good if the score is > 50% (> 5). The variable of child feeding parenting patterns is measured through a questionnaire containing eight questions with yes (score 1) and no (score 0) answers. A score < 4 is categorized as poor, while a score ≥ 4 is classified as good. Furthermore, environmental sanitation variables were measured using an observation questionnaire with eight questions using a similar scoring system, namely, a yes answer was given a score of 1, and a no answer was given a score of 0, with the category being poor if the score was <4 and good if the score was ≥4.

### Data Collection.

The data collection method employed in this study utilized both primary and secondary data. Primary data was obtained by completing a questionnaire instrument compiled by the researcher based on variables related to stunting incidence. Before use, the questionnaire was tested for validity and reliability to ensure its suitability as a research measurement tool. The questionnaire was piloted on 30 mothers with toddlers aged 24–59 months in Simanindo District, Samosir Regency, because it has similar population characteristics to the research sample. However, it was conducted at a different time. Validity testing was performed using the Pearson Product-Moment correlation technique between the score of each item and the total score, with the validity criterion being that the value count is greater than the r table (0.362). Invalid items were eliminated from the instrument. Next, a reliability test was conducted using Cronbach's Alpha coefficient, with a reliable criterion of an Alpha value equal to or greater than the r table value. The test results showed that all research variables, namely knowledge (A = 0.855), child feeding and parenting patterns (A = 0.803), and environmental sanitation (A = 0.864), met the validity and reliability requirements. Meanwhile, secondary data was obtained from the Buhit Community Health Center in 2025, in the form of identity data for toddlers who experienced stunting and data on toddlers aged 24–59 months who did not experience stunting.



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**Data Processing.**

Before analysis is carried out, the data obtained is first processed so that it can be used as research information. The data processing process includes several stages, namely: (1)editing, namely re-checking the completeness of the questionnaire answers and making improvements if deficiencies are found; (2)coding, namely changing qualitative data into codes in the form of numbers to facilitate the analysis process; (3)tabulating, namely presenting data in the form of a simple frequency distribution table to make processing and concluding easier; and (4)cleaning, namely re-checking the data that has been entered to ensure there are no errors or omissions. Missing data before further analysis is carried out.

**Data Analysis.**

Data analysis is carried out after all data have been collected and processed through various stages—editing, coding, tabulating, entry, and cleaning with the help of computer software. The analysis method employed consists of three phases. First, univariate analysis aims to describe the frequency distribution of the independent and dependent variables. Second, bivariate analysis to determine the relationship between the independent and dependent variables using the Chi-square test at a significance level of 5% ($p< 0.05$), where significant results indicate the influence of the independent variable on the dependent variable. Third, multivariate analysis using logistic regression was employed to determine the independent variable that most dominantly influences the incidence of stunting in toddlers aged 24–59 months, with a 95% confidence level ($\alpha = 0.05$).

## Results and Discussion

**Description of Research Location**

As a technical implementation unit of the Samosir Regency Health Office, the community health center (Puskesmas) is responsible for implementing health development within its working area. The function of the Puskesmas is to act as a driving force for health-oriented development, a center for community empowerment, and a primary health care center. The primary health care services under the Puskesmas' responsibility include individual and community health services. Buhit Community Health Center is located at Jalan Raya Simanindo km 3, Pardugul Village, Pangururan District, Samosir Regency, North Sumatra Province. This community health center covers an area of 121.43 km$^2$, with a population of 34,607. The Buhit Community Health Center's operational area encompasses 28 villages, serving 45 Posyandu (infant and toddler health posts). All Posyandu actively conduct weighing and measuring of toddlers at the Posyandu, including health education and Early Detection and Intervention Growth and Development Stimulation (SDIDTK).

Buhit Health Center also makes various efforts to accelerate the reduction and prevention of stunting. One of them is making specific intervention efforts to accelerate efforts. The target group includes adolescent girls, prospective brides, pregnant and breastfeeding mothers, as well as infants and toddlers. For teenage girls aged 12-18, one iron supplement tablet is administered three times a day (TID) once a week. For prospective brides, a health check is conducted, and 30 iron supplements are provided. Furthermore, pregnant women receive a minimum of six ANC services, receive a minimum of 90 iron supplements during pregnancy, and are required to attend prenatal classes to increase their knowledge. For breastfeeding mothers and those with toddlers, health services, counseling, and nutrition education are provided, including support for stunting, balanced nutrition, the "Fill My Plate" program, and PHBS at the integrated health post.

**Univariate Analysis**

This univariate analysis aims to determine the frequency distribution of each research variable, including Stunting Incidence, Knowledge, Parenting Patterns, Child Feeding, and Sanitation, as shown in Tables 1 and 2 below.

**Table 1.** Distribution of Stunting Incidence in Toddlers Aged 24-59 Months in the Working Area of Buhit Health Center, Samosir Regency in 2025

| Incident Stunting | n | % |
|---|---|---|
| Stunting | 33 | 37.5% |
| No Stunting | 55 | 62.5% |
| Amount | 88 | 100% |



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According to Table 1, the incidence of stunting in the Buhit Health Center area is 62.5%.

**Table 2.** Frequency distribution of respondents based on the variables studied in the working area of Buhit Health Center, Samosir Regency, in 2025.

| No | Variables | Category | n | % |
|---|---|---|---|---|
| 1 | Knowledge | Not good | 45 | 51,14 |
| | | Good | 43 | 48,86 |
| | | **Total** | 88 | 100 |
| 2 | Parenting Feeding Patterns | Not good | 53 | 60,23 |
| | | Good | 35 | 39,77 |
| | | **Total** | 88 | 100 |
| 3 | Environmental Sanitation | Not good | 28 | 31,82 |
| | | Good | 60 | 68,18 |
| | | **Total** | 88 | 100 |

Based on the table above, it can be seen that the majority of respondents lack knowledge, specifically 45 people (51.14%). The majority of respondents have poor child feeding patterns, namely 53 people (60.23%). With environmental sanitation, the majority of respondents are good, namely 60 people (68.18%).

**Bivariate Analysis**

**The Relationship Between Knowledge and Stunting Incidence**

**Table 3.** The Relationship between Knowledge and the Incidence of Stunting in Toddlers Aged 24-59 Months in the Working Area of Buhit Health Center, Samosir Regency in 2025

| Knowledge | Stunting Incident | | Total | p-value | OR |
|---|---|---|---|---|---|
| | Stunting (n/%) | No Stunting (n/%) | n (%) | | |
| Not good | 27 (60,0%) | 18 (40,0%) | 45 (100,0%) | | |
| Good | 6 (13,95%) | 37 (86,05%) | 43 (100,0%) | 0,000 | 9,250 |
| Total | 33 (37,5%) | 55 (62,5%) | 88 (100,0%) | | |

Based on the table above showing the results of the analysis of the relationship between the respondent's knowledge and the occurrence of stunting in children aged 24-59 months, it was found that there were as many as 27 people (60%) respondents with less knowledge of having toddlers stunting Meanwhile, among respondents with good understanding, there were 37 people (86.05%) who had toddlers who did not have stunting.

The results of the analysis using the Chi-Square test yielded a value of 0.000 ($p < 0.05$), indicating a significant relationship between respondents' knowledge and the incidence of stunting in children aged 24-59 months in the Buhit Community Health Center Work Area, Samosir Regency, in 2025. The OR value (95% CI) is 9.250, which means that the group of parents with good knowledge has a 9.250 times chance of having toddlers who are not stunted. Stunting compared to the less knowledgeable group.

**The Relationship between Parenting Patterns and Child Feeding and the Incidence of Stunting**

Based on the table above, the results of the analysis of the relationship between parenting patterns for feeding children and the incidence of stunting in children aged 24-59 months showed that 31 respondents (58.49%) with poor parenting patterns for feeding children had toddlers. Stunting was observed among the respondents with poor child feeding parenting patterns, while among those with good child feeding parenting patterns, 33 people (94.29%) had toddlers who did not exhibit stunting.

The results of the analysis using the Chi-Square test yielded a value of 0.000 ($p < 0.05$), indicating a significant relationship between respondents with good child feeding parenting patterns and the incidence of stunting in children aged 24-59 months in the Buhit Community Health Center Work Area, Samosir Regency, in 2025. The OR value (95% CI) is 23.250, which means that the group of respondents with good child feeding parenting patterns has a 23.250 times greater chance of having toddlers who are not stunted compared to the group of respondents with poor child feeding parenting patterns.



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**Table 4.** The Relationship between Parenting Patterns and Child Feeding with the Incidence of Stunting in Toddlers Aged 24-59 Months in the Working Area of Buhit Health Center, Samosir Regency in 2025

| Parenting Patterns for Feeding Children | Incident Stunting | | | | Total | | p- value | OR |
|---|---|---|---|---|---|---|---|---|
| | Stunting | | No Stunting | | | | | |
| | n | % | n | % | n | % | | |
| Not good | 31 | 58.49 | 22 | 41.51 | 53 | 100 | 0,000 | 23.25 |
| Good | 2 | 5.71 | 33 | 94.29 | 35 | 100 | | |
| Total | 33 | 37.50 | 55 | 62.50 | 88 | 100 | | |

**The Relationship between Environmental Sanitation and Stunting Incidence**

**Table 5.** The Relationship between Environmental Sanitation and Stunting Incidence in Toddlers Aged 24-59 Months in the Working Area of Buhit Health Center, Samosir Regency in 2025.

| Environmental Sanitation | Incident Stunting | | | | Total | | *p- value* | *OR* |
|---|---|---|---|---|---|---|---|---|
| | Stunting | | No Stunting | | | | | |
| | n | % | n | % | n | % | | |
| Not good | 17 | 60.71 | 11 | 39.29 | 28 | 100.00 | *0,004* | *4.25* |
| Good | 16 | 26.67 | 44 | 73.33 | 60 | 100.00 | | |
| Total | 33 | 37.50 | 55 | 62.50 | 88 | 100.00 | | |

Based on the table above, the results of the analysis of the relationship between environmental health and stunting incidence in children aged 24-59 months are presented. It was found that 17 respondents (60.71%) with poor ecological health had toddlers. Stunting was observed among respondents with poor environmental health, while among those with good environmental health, 44 people (73.33%) had toddlers who did not exhibit stunting.

The results of the analysis using the Chi-Square test yielded a value of 0.004 ($p < 0.05$), indicating a significant relationship between respondents with good home environmental health conditions and the incidence of stunting in children aged 24-59 months in the Buhit Community Health Center Work Area, Samosir Regency, in 2025. The OR value (95% CI) is 4.250, indicating that the group of respondents with good home environmental health conditions has a 4.250 times greater chance of having toddlers who are not stunted. Stunting compared to the group of respondents with poor home ecological health conditions.

**Multivariate Analysis**

Multivariate analysis was performed using logistic regression to determine the relationship between knowledge, child feeding patterns, and environmental health (independent variables) and the incidence of stunting (dependent variable).

The steps that must be taken in multivariate analysis are selecting candidate variables for multivariate analysis and multivariate modeling. The independent variables included in the multivariate analysis are those that have undergone bivariate analysis and yielded significant results. P-value < 0.25. But when there is a value variable with a p-value > 0.25, but it is substantively essential, then the variable can be included in the multivariate model. The results of the bivariate selection are presented in Table 6.

**Table** 6.Bivariate Selection Results

| Variables | p-value | Information |
|---|---|---|
| Knowledge | 0.000 | Moving on to multivariate |
| Parenting Patterns for Feeding Children | 0.000 | Moving on to multivariate |
| Environmental Health | 0,004 | Moving on to multivariate |

**Multivariate Modeling**

At this stage, testing is carried out using logistic regression, where all variables with a p-value < 0.25 are tested simultaneously. Valid variables in the multivariate model are those with a p-value < 0.05. If present in a multivariate model with a p-value > 0.05, the variable must be removed from the model. The exclusion of variables with a p-value> 0.05 is done gradually. Starting from the value of the largest. In the first stage of



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modeling, the variables that were advanced to multivariate analysis were knowledge, child feeding patterns, and environmental health.

**Table** 7.Results of Stage 1 Logistic Regression Analysis

| Variables | B | p-value | OR | 95% C.I.for EXP(B) | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| Knowledge | 3.628 | 0.000 | 37.639 | 6.77 | 209.264 |
| Parenting Patterns for Feeding Children | 4.691 | 0.000 | 108.953 | 13.533 | 877.197 |
| Environmental Health | 1.126 | 0.135 | 3.083 | 0.704 | 13.489 |

Description: B = Constant, OR =*Odds Ratio*, CI = Confidence Interval (Confidence Interval)

From Table 7, it can be seen that the environmental health variable has the biggest p-value (p-value = 0.135). Therefore, in the second model, the ecological health variable was removed. In the second model, the variables analyzed were the level of knowledge and parenting patterns related to child feeding.

**Table** 8.Final Stage Logistic Regression Analysis Results

| Variables | B | p-value | OR | 95% C.I.for EXP(B) | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| Knowledge | 3.766 | 0.000 | 43.213 | 7.973 | 234.193 |
| Parenting Patterns for Feeding Children | 4.658 | 0.000 | 105.463 | 13.888 | 800.848 |

Description: B = Constant, OR =*Odds Ratio*, CI = Confidence Interval (Confidence Interval)

From Table 8, the p-value for both variables is obtained as <0.05, indicating that the logistic regression model is statistically significant. The remaining variables are knowledge and child feeding patterns. From the multivariate analysis, the dominant factors associated with stunting in toddlers aged 24-59 months in the Buhit Community Health Center, Samosir Regency, in 2025 were knowledge and child feeding patterns.

The results of the analysis of the level of knowledge obtained p-value = 0.000, which means there is a relationship between the level of expertise and the incidence of stunting in toddlers aged 24-59 months in the Buhit Community Health Center area, Samosir Regency in 2025 and OR = 43.213 (95% CI = 7.971– 234.193), which means toddlers with less parental knowledge have a 43.213 times greater chance of being affected by stunting than children with good knowledge.

The results of the analysis of Child Feeding Parenting Patterns were obtained p-value = 0.000, which means there is a relationship between child feeding parenting patterns and the incidence of stunting in toddlers aged 24-59 months in the Buhit Health Center area, Samosir Regency in 2025 and OR = 105.463 (95% CI = 13.888– 800.848), which means that children with poor child feeding parenting patterns are 105.463 times more likely to be affected by stunting than children with good child feeding parenting patterns.

The dominant variable related to the incidence of stunting in toddlers aged 24-59 months in the Buhit Community Health Center area, Samosir Regency, in 2025 is the pattern of parenting and child feeding.

## Discussion

### The Relationship Between Knowledge and the Incidence of Stunting in Toddlers Aged 24-59 Months in the Buhit Community Health Center Work Area

The results of the analysis using the Chi-Square test yielded a value of 0.000 ($p < 0.05$), indicating a significant relationship between respondents' knowledge and the incidence of stunting in children aged 24-59 months in the Buhit Community Health Center Work Area, Samosir Regency, in 2025. The OR value (95% CI) is 9.250, which means that the group of parents with good knowledge has a 9.250 times chance of having toddlers who are not stunted. Stunting compared to the less knowledgeable group.

In line with the research results from Juniatari et al. (2023), a significant relationship was found between maternal knowledge regarding the incidence of stunting in toddlers in the Abang I Health Center work area and a p-value of 0.001. Similarly, research by Ningtyas, Y. P., Udiyono, A., & Kusariana, N. (2020) stated that maternal knowledge about nutrition is a factor related to stunting [11]. This finding aligns with research by Ariani & Puspita (2021) at the Gianyar Regency Community Health Center, which revealed that 51 mothers (42.5%) had insufficient knowledge about stunting [12].



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Knowledge encompasses everything a person or respondent knows about health and illness, including stunting, its causes, characteristics, impacts, prevention methods, nutritional status, sanitation, and other related factors. The more knowledge a person has, the more positive their behavior will be. A mother's nutritional knowledge can be influenced by various factors, including age, education, occupation, and socioeconomic status, which encompasses income. Therefore, if a mother lacks sufficient dietary understanding, the food intake provided to her toddler will also be inappropriate and can negatively impact the toddler's health [13].

This study found that 45% of mothers' knowledge was inadequate, according to the researchers' assumptions. This was due to mothers not regularly visiting integrated health posts (Posyandu), so when officers conducted outreach, they did not receive the information. Furthermore, in the mother-to-toddler classes held by the community health center, not all mothers of toddlers were willing to attend, resulting in a lack of information about stunting.

Therefore, efforts that can be tried for improvement include providing information about stunting not only through direct counseling but also through leaflets and posters created by integrated health posts (Posyandu), so that mothers can access the information when counseling is not available at the Posyandu.

In this study, it was found that 45% of mothers (18 respondents) with poor knowledge did not experience stunting. According to the researcher's assumption, this could be because the mothers had inadequate knowledge about. Stunting is less prevalent, but in caring for their children, mothers often adhere to family customs that require them to provide exclusive breastfeeding until the child is 6 months old. When giving the child food, it must be entirely consumed so that the child's nutritional needs can be met, preventing stunting and ensuring the mother's well-being. In this study, it was also found that mothers with good knowledge were 13.95% (6 respondents), but had stunted children. According to the researcher's assumption, this could happen if the knowledge the mother has is not applied correctly in raising children to prevent stunting.

**The Relationship between Parenting Patterns and Child Feeding with the Incidence of Stunting in Toddlers Aged 24-59 Months in the Buhit Community Health Center Work Area**

The results of the analysis using the Chi-Square test yielded a value of 0.000 ($p < 0.05$), indicating a significant relationship between respondents with good child feeding parenting patterns and the incidence of stunting in children aged 24-59 months in the Buhit Community Health Center Work Area, Samosir Regency, in 2025. The OR value (95% CI) is 23.250, which means that the group of respondents with good child feeding parenting patterns has a 23.250 times greater chance of having toddlers who are not stunted compared to the group of respondents with poor child feeding parenting patterns.

In line with research by Syefei et al. (2023), a significant relationship was found between child feeding patterns and the incidence of stunting ($p < 0.020$) [14]. Likewise, according to Nurrasyidah's research (2022), a relationship exists between the parenting pattern of feeding and the occurrence of stunting ($p < 0.042$) [15]. Similarly, the research results of Laili et al. (2021) stated that poor parenting patterns will increase the risk of stunting in toddlers, with the solution being health workers [16,17].

According to theory, nutrition is the primary factor supporting metabolic processes in the body. Every chemical reaction in the body requires specific nutrients to carry out. Nutritional problems, whether deficient or excessive, can affect endocrine balance. For example, overnutrition and excessive consumption of carbohydrates and fats can lead to an imbalance in the body's insulin hormone, which increases the risk of disease. Malnutrition can result in delayed growth and organ maturation, as well as a significantly shorter body size [18].

In this study, researchers found that only 22% of children finished their meals when fed. The researchers hypothesized that this could be because many parents still don't understand parenting patterns that meet their nutritional needs. Therefore, efforts to improve this include increasing mothers' knowledge through counseling in mother-to-toddler classes and family support. Mothers with a sufficient understanding of nutrition will be more likely to attend to their children's dietary needs for optimal growth and development, thereby preventing stunting in toddlers.

Good parenting practices to prevent stunting can be found in feeding practices. Parenting is the ability of parents and families to provide children with time, attention, affection, and support, enabling them to grow and develop optimally in all aspects of their physical, mental, and social development. Parenting is a factor closely related to the growth of children under the age of five [19,20].


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In this study, it was found that 41.51% of mothers (22 respondents) had poor child feeding patterns, and their children did not experience any adverse health outcomes. Stunting According to the researcher's assumption, this could happen if the mother has a poor parenting pattern for feeding her child, but in the daily feeding habits for her child, the mother does it according to the family's habits or traditions that the child must eat 3 times a day and the food must be finished so that the child's nutritional needs can be met so that the child does not. Stunting. In this study, it was also found that mothers with good child feeding parenting patterns were 5.71% (2 respondents), but they had children who were stunted. According to the researcher's assumption, this could happen because the mother's good parenting patterns for feeding children are not applied when feeding children, such as not providing food according to the child's current needs, or when eating, the mother does not finish the food..

Ramadanti's (2022) theory states that children with permissive parenting styles will experience several doubts, including a lack of respect for rules and increased spoiled behavior, as they feel their parents will give them everything they want. The ideal parenting style is democratic parenting, as it has the potential to improve children's nutritional status. Parents who adopt democratic parenting styles generally pay more attention to their children's nutritional intake [21].

**The Relationship Between Environmental Sanitation and the Incidence of Stunting in Toddlers Aged 24-59 Months in the Buhit Community Health Center Work Area**

The results of the analysis using the Chi-Square test yielded a value of 0.004 ($p < 0.05$), indicating a significant relationship between respondents with good home environmental health conditions and the incidence of stunting in children aged 24-59 months in the Buhit Community Health Center Work Area, Samosir Regency, in 2025. The OR value (95% CI) is 4.250, indicating that the group of respondents with good home environmental health conditions has a 4.250 times greater chance of having toddlers who are not stunted compared to the group of respondents with poor home ecological health conditions.

In line with Adhani's research (2024), a significant relationship was found between unhealthy environmental sanitation and the incidence of stunting in toddlers in the working area of the Karanganyar I Health Center, Demak Regency (p-value = 0.001) [22]. Other research is also in line with Ainy (2020), who found a significant relationship between environmental sanitation and the incidence of stunting, with a p-value of 0.001 [23]. Likewise, research conducted by Wulandari et al. (2019) found a significant relationship between environmental sanitation and the incidence of stunting, with a p-value of 0.008 [24].

In this study, 16 respondents (26.67%) who had good environmental sanitation still experienced stunting in their toddlers. According to the researcher's assumption, this could occur because the study also found that stunting in toddlers was associated with family components that lacked wastewater drainage at home. It was also found that the mother's house had adequate ventilation. This can cause toddlers to suffer from diseases such as respiratory tract infections and diarrhea, which can impact the child's growth and development.

This is in line with the theory that poor environmental sanitation allows various bacteria to enter the body. This can cause multiple diseases, including diarrhea, intestinal parasites, fever, malaria, and other illnesses. Infections can interfere with nutrient absorption, leading to malnutrition and stunted growth. One of the causes of stunting is linked to water and sanitation factors. Improving environmental sanitation is crucial for preventing health problems in toddlers, particularly stunting, by promoting Clean and Healthy Living Behaviors (CHLB) [8].

In this study, it was found that 39.29% (11 respondents) of families had poor environmental health conditions, but the toddlers from these families did not experience any adverse effects. Stunting could be prevented because the majority of mothers employed good parenting practices that ensured their children's adequate nutritional needs were met. The study also found that 26.67% (16 respondents) of families had good environmental health, despite having children. According to the researcher's assumption, stunting could occur even in areas with good environmental sanitation. However, it is still found that in this family, some do not have toilets, some do not have wastewater drainage channels, and it is also found that families do not have garbage disposal sites. It is also found that several families whose houses do not have good ventilation, where this condition can become a nest of disease, because animals such as insects can live in dirty places with stagnant water, so that it can pollute the environment and become a trigger for various environmentally based diseases, one of which is stunting.


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## Conclusion

Based on the results of research on factors related to the incidence of stunting in toddlers aged 24–59 months in the working area of the Buhit Community Health Center, Samosir Regency, in 2025, it can be concluded that there is a significant relationship between maternal knowledge and the incidence of stunting ($p = 0.000$). In addition, there is an essential relationship between parenting patterns related to feeding and the incidence of stunting ($p = 0.000$), as well as between environmental sanitation and the incidence of stunting ($p = 0.004$). The most dominant factor related to the incidence of stunting is the pattern of parenting and feeding children.

## Conflict of Interest

The author declares no competing interests and asserts that the research was conducted autonomously, safeguarding the impartiality and validity of the results.

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## Supplementary Materials

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