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# The Role of Nurturing Care Framework Domains in Predicting Stunting Among Toddlers: Evidence from the Pagambiran Padang Health Service Area

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## Article Info

## Abstract

*A linear growth condition called stunting is brought on by frequent illnesses and poor nutrition. The Nurturing Care Framework, which prioritizes health care, proper nutrition, responsive caregiving, early learning opportunities, and safety and security, is the basis for prevention activities. The purpose of this study was to examine the connection between stunting in toddlers in the Pagambiran Padang Community Health Center region and parental risk factors based on the Nurturing Care Framework. The study was carried out between June 2024 and January 2025 using an analytical cross-sectional design. 214 children between the ages of 24 and 59 months were selected by stratified random sampling and basic random sampling. A questionnaire was used to gather the data, and univariate analysis, bivariate analysis using chi square, and multivariate analysis using multiple logistic regression with the backward technique were all used to examine the results. Stunting was present in 43.9% of people. 55.1 percent of parenting styles were classified as subpar according to the Nurturing Care Framework. Stunting was substantially correlated with safety and security, proper nutrition, and health care, according to multivariate data. The most important factor was enough nutrition. In accordance with the Nurturing Care Framework, the study suggests interdisciplinary cooperation to address nutritional issues, improve basic health services, track children's growth and development, and foster a healthy environment.*

## INTRODUCTION

Stunting is one of the nutritional issues that communities all around the world are currently dealing with. By 2025, the ambitious World Health Assembly wants to see a 40% decrease in stunting rates globally. Approximately 149.2 million (22.0%) children under five suffer from stunting, a condition that impedes human development globally, according to the 2020 Global Nutritional Report. Indonesia, located in Southeast Asia, has a 30.0% stunting prevalence, one of five subregions defined by the World Health Organization (WHO) (WHO, 2022). Higher rates of mortality, illness, and suboptimal growth are experienced by children with stunted growth (Vaivada et al., 2020). Long-term consequences of stunting include reduced

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economic productivity, impaired cognitive-motor development, decreased survival, and an increased likelihood of experiencing poverty as an adult (Black et al., 2013; Fernandes & Lee, 2021; Lestari et al., 2024; Nguyen & Thrinh, 2024; Awaludin et al., 2025).

According to the findings of the 2018 Basic Health Research (Riskesdas), 30.8% of Indonesian toddlers, or around 7 million toddlers, had stunting, or short stature for age (Ministry of Health of the Republic of Indonesia, 2018). Additionally, the 2022 Indonesian Nutritional Status Study (SSGI) found that 21.6% of the country's population was stunted. The incidence was 19.5% in Padang City and 25.2% in West Sumatra Province. The WHO has a maximum prevalence target of 20%, thus this is still an issue. In order to meet the 14% goal by 2024, acceleration is therefore required (Ministry of Health, 2023).

According to a study by Yusrawati et al. (2022) on the early identification of stunting in the Pagambiran Community Health Center's operating area in Padang City, 44% of toddlers were categorized as short, while another 6% were categorized as very short. The Lubuk Begalung District region, which includes the Pagambiran Community Health Center's operational area, is designated as a priority locus for integrated stunting prevention and management in 2023 by Padang Mayor's Decree No. 342 of 2022 (Padang City Health Office, 2023). The Pagambiran Community Health Center (Puskesmas) area ranks second in terms of child stunting, according to data from the 2023 Padang City Health Profile. Stunting affects 232 (9.6%) of the 2,806 toddlers in the Pagambiran Community Health Center area. While the prevalence is lower than that of the Seberang Padang Community Health Center, which had 151 children with stunting (15.4%), the number of people experiencing stunting is larger. (Padang City Health Office, 2023; Andika, 2021; Haron et al., 2023).

Risk factors for stunting in West Sumatra Province, based on research (Masrul et al., 2020), include maternal education, birth weight, exclusive breastfeeding, diet, and parenting patterns. Parenting patterns are an indirect cause of stunting and, if not implemented properly, can become a direct cause of stunting (UNICEF, 2015; Achmad et al., 2023; Fikrih et al., 2025). Tørslev et al. (2021) stated that there are four important components in parenting patterns: food provision, hygiene, health, and psychosocial stimulation (Nita, 2023; Engle et al., 1999; dos Santos Costa et al., 2025; Masita et al., 2024). This also supports previous research conducted by Nurdin et al. (2019) that toddlers with a history of poor parenting are at 3.9 times greater risk of experiencing stunting. Data from the Ministry of Women's Empowerment and Child Protection shows that as many as 75% or the majority of parents in Indonesia do not make any effort to improve their own capacity in terms of parenting (Ministry of Women's Empowerment, Child Protection, Population Control, and Family Planning (DP3AP2KB) of Padang City in 2022, there were 64 cases of toddlers reported receiving inappropriate parenting patterns, and Lubuk Begalung District was the third most affected by inappropriate parenting patterns after South Padang District.

Eating patterns have an influence on the incidence of stunting, as proven by the research results of Kustini et al. (2025) conducted in the work area of the Senen District Health Center, DKI Jakarta Province, which stated that the risk of stunting in toddlers is the most dominant.is the pattern of parenting feeding (p value = 0.000; odds ratio = 6.496; 95% CI = 2.486-16.974) and a 6 times greater risk of experiencing stunting. This is in line with research by Arlinda et al. (2022) on the determinants of stunting in West Pasaman Regency, which found that the greatest indirect influence on the incidence of stunting is parenting feeding (path coefficient = 0.90).

## METHODS

The current study was designed as an observational analytical study that uses a cross-sectional model. The choice of this design was based on the multifactorial etiology of stunting which included nutritional, health, caregiving, and environmental factors. Concurrent measurement of exposure and outcome variables was made with the help of cross-sectional methodology, and it provided a full picture of the relationship between Nurturing Care Framework (NCF)-based parenting practices and the prevalence of stunting. Due to the impractical nature of longitudinal experimental monitoring of stunting in this case, cross-sectional was considered the most suitable one.

The entire population of the study was selected as the mothers of toddler with an age of 24-59 months living within the catchment area of the Pagambiran Community Health Center in the Lubuk Begalung District, Padang City. The location was intentionally chosen due to its designation as a priority locus of stunting prevention hence contributing to better representativeness regarding a deep analysis of the risk-factors. The sample comprised 1,902 mother-child dyads that were eligible. The sampling was carried out in two phases, firstly, stratified random sampling was done to ensure representation of the different social and environmental levels and then simple random sampling in order to maintain equity and reduce selection bias. As a result, 214 participants were invited, and no one out of the participants failed to meet the inclusion criteria, which included permanent residency in the study area and willingness to take part in the study, which was verified through the informed consent signed.

The data collection involved the use of a structured questionnaire which was previously prepared and validated to be clear. The tool included the five dimensions of the NCF including health care, sufficient nutrition, responsive caregiving, early learning opportunities, and safety and security along with sociodemographic variables that are related to mothers and children. Anthropometric data was collected; special attention was paid to height-to-age (HAZ) which was later compared to WHO Child Growth Standards to determine whether the child is stunted or not. In order to achieve accuracy and uniformity, data collectors were trained on interview methods and anthropometric measures; thus, minimizing measurement error and bias by observers.

The analysis of data was done in stages. The first stage of univariate analysis included the prevalence of stunting and distribution of parenting practices across the NCF elements. This was followed by bivariate tests which used chi-square tests to establish significant relationships between each NCF component and stunting with a significant level of $p$ below 0.05. Lastly, multivariate analyses were performed through using several logistic regression with a backward elimination approach that helped in identifying risk factors with the highest salience besides controlling possible confounders. This methodical process allowed the search of correlations and the definition of the factor of parenting that has the greatest correlation with stunting.

## RESULTS AND DISCUSSION

### Univariate Analysis

Univariate analysis was used to describe the frequency distribution of each studied variable. The data analyzed included stunting incidence, parenting patterns using the composite NCF approach, good health, adequate nutrition, responsive care, opportunities for early learning, and security and safety.

*Stunting Incident*

Table 1. Distribution of the Frequency of Stunting Incidents in Toddlers in the Working Area of the Pagambiran Padang Health Center

| Nutritional Status based on Height/Age | f | % |
|---|---|---|
| *Stunting* | 94 | 43.9 |
| Normal | 120 | 56.1 |
| Total | 214 | 100 |

Table 1 shows that the number of toddlers with normal nutritional status is greater than the number of toddlers experiencing stunting in the working area of the Pagambiran Padang Health Center.

## Parenting Using the NCF Approach

The distribution of each parenting pattern component based on the NCF is as follows:

### Good Health

Table 2. Distribution of Frequency of Health Fulfillment (Good Health) in the Working Area of Pagambiran Padang Health Center

| Good Health | f | % |
|---|---|---|
| Not good | 121 | 56.5 |
| Good | 93 | 43.5 |
| Total | **214** | **100** |

Table 2 shows that most respondents have poor health (good health) category.

### Adequate Nutrition

Table 3. Distribution of Frequency of Adequate Nutrition in the Working Area of the Pagambiran Padang Health Center

| Adequate Nutrition | f | % |
|---|---|---|
| Not good | 105 | 49.1 |
| Good | 109 | 50.9 |
| Total | 214 | 100 |

Table 3 shows that adequate nutrition for toddlers is relatively balanced.

### Responsive Care

Table 4. Frequency Distribution of Responsive Care in the Work Area of the Pagambiran Padang Health Center

| Responsive Care | f | % |
|---|---|---|
| Unresponsive | 133 | 62.1 |
| Responsive | 81 | 37.9 |
| Total | 214 | 100 |

Table 4 shows that most respondents have responsive care in the unresponsive category.

### Opportunities for Early Learning/Early Stimulation

Table 5. Frequency Distribution of Early Learning Opportunities/Early Stimulation (Opportunities for Early Learning) in the Work Area of the Pagambiran Padang Health Center

| Opportunities for Early Learning/Early Stimulation | f | % |
|---|---|---|
| Not good | 114 | 53.3 |
| Good | 100 | 46.7 |

| | 214 | 100 |
|---|---|---|
| Total | 214 | 100 |

Table 5 shows that most respondents have opportunities for early learning/early stimulation (opportunities for early learning) in the poor category.

## Security and Safety

Table 6. Distribution of Security and Safety Frequency in the Work Area of the Pagambiran Padang Health Center

| Security and Safety | f | % |
|---|---|---|
| Not good | 96 | 44.9 |
| Good | 118 | 55.1 |
| Total | 214 | 100 |

Table 6 shows that some respondents have good security and safety categories.

## Parenting Using the NCF Approach

The results of the study show the frequency distribution of parenting patterns using the NCF approach for toddlers in the Pagambiran Padang Community Health Center work area as follows:

Table 7. Frequency Distribution of Parenting Patterns Using the NCF Approach in the Work Area of the Pagambiran Padang Health Center

| Parenting Patterns Using the NCF (Composite) Approach | f | % |
|---|---|---|
| Not good | 118 | 55.1 |
| Good | 96 | 44.9 |
| Total | 214 | 100 |

Table 7 shows that most respondents apply poor parenting patterns based on the NCF approach.

## Multivariate Analysis

The stages of multivariate analysis in this research model are:

### Candidate Variable Selection

The most dominant independent variables in parenting patterns using the NCF approach were identified through multivariate analysis. Before starting the multivariate test, the first step was to select variables to be included in the multivariate analysis, namely variables that in the bivariate analysis had a p-value <0.25. The results can be seen in the following table:

Table 14. Candidate Variables for Multivariate Analysis

| Candidate Variables | *P value* | Information |
|---|---|---|
| Good Health | 0,000 | Enter candidate |
| Adequate Nutrition | 0,000 | Enter candidate |
| Responsive Care | 0,000 | Enter candidate |
| Opportunities for Early Learning/Early Stimulation | 0,000 | Enter candidate |
| Security and Safety | 0,000 | Enter candidate |

Based on Table 14, it shows that at the initial stage all NCF components meet the requirements for multivariate analysis.

## Multivariate Modeling

Multivariate modeling was performed using multiple logistic regression. Eligible variables were then analyzed using the backward elimination method, with a significance threshold of p-value <0.05. Variables with a p-value >0.05 were

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automatically removed for the next stage. The results of the multivariate modeling using the backward elimination method can be seen in Table 15.

Table 15. First Stage Results of Multivariate Analysis with Logistic Regression Backward Elimination Method

| Variables | OR | CI 95% | *p-value* |
|---|---|---|---|
| Good Health | 2,640 | 0.885 - 7.879 | 0.082 |
| Adequate Nutrition | 8,004 | 3,285 - 19,501 | 0,000 |
| Security and Safety | 2,386 | 1,096 – 5,194 | 0.028 |
| Opportunities for Early Learning/Early Stimulation | 1,179 | 0.403 – 3.447 | 0.763 |
| Responsive Care | 1,124 | 0.350 - 3.612 | 0.844 |

Based on table 15, it is known that the responsive care variable is the variable with the largest p-value so it is removed from the model. The results can be seen in the following table:

Table 16. Second Stage Results of Multivariate Analysis with Logistic Regression Backward Elimination Method

| Variables | OR | CI 95% | *p-value* |
|---|---|---|---|
| Health Fulfillment<br>*(Good Health)* | 2,690 | 0.917 – 7.888 | 0.072 |
| Adequate Nutrition | 8,383 | 3,901 – 18,014 | 0,000 |
| Security and Safety | 2,405 | 1,110 – 5,212 | 0.026 |
| Early Learning Opportunities/Early Stimulation<br>*(Opportunities for Early Learning)* | 1,215 | 0.435 - 3.394 | 0.710 |

Based on table 16, it is known that the variable opportunities for early learning/early stimulation (opportunities for early learning) is the variable with the largest p-value, so it is removed from the modeling.

Table 17. Final Stage of Multivariate Analysis Results with Logistic Regression Backward Elimination Method

| Variables | OR | CI 95% | *p-value* |
|---|---|---|---|
| Health Fulfillment<br>*(Good Health)* | 3,042 | 1,296 – 7,142 | 0.011 |
| Adequate Nutrition | 8,602 | 4,048 – 18,279 | 0,000 |
| Security and Safety | 2,443 | 1,134 – 5,263 | 0.023 |

Based on the table 17 The results of the multivariate analysis showed three modeling stages. Good health, adequate nutrition, and security and safety all had statistically significant relationships. In the final modeling, the most dominant variable associated with stunting was adequate nutrition. This means that toddlers with inadequate nutrition had an 8.602 times greater risk of stunting than toddlers with adequate nutrition.

**Factors Influencing Stunting in the Study Area**

The results of the study showed that as many as 43.9% of toddlers aged 24-59 months in the working area of the Pagambiran Padang Health Center experienced stunting.This finding is in line with previous research byYusrawati et al., (2022)regarding early detection of stunting in infants and toddlers in the working area of the Pagambiran Community Health Center in Padang City, which reported that 44% of toddlers were short and 6% were very short, and research by Ezeh et al. (2021) conducted in the same location found a stunting prevalence of 42.5% in 174 toddlers aged 24–59 months. This result is higher than the global data in 2022,

which reached 22.3% (WHO, 2023), national data in 2023 was 33.5%, and the prevalence of stunting in West Sumatra Province in 2023 was 23.6% and Padang City was 24.2% (Ministry of Health, 2023).

Field findings in this study indicate that stunting is influenced not only by nutritional factors but also by suboptimal parenting patterns. Based on an analysis of the five components of the National Child Health Foundation (NCF), it was found that mothers of stunted toddlers tend to pay less attention to their children's emotional needs, rarely provide early stimulation, and are inconsistent in taking their children to Posyandu (Integrated Health Post) or completing immunizations. Stunted toddlers also experience more frequent recurrent infections, such as diarrhea and acute respiratory infections (ARI). In terms of nutritional fulfillment, stunted toddlers were found to have more frequent substandard diets, low animal protein consumption, and a history of inadequate exclusive breastfeeding. These findings align with research by Bliznashka et al. (2021) in Sub-Saharan Africa, which demonstrated that responsive parenting and meeting nutritional needs significantly impact child growth.

Environmental factors also contribute significantly to stunting. Research shows that most stunted toddlers live in environments with poor sanitation, lack access to healthy latrines, and are exposed to cigarette smoke from smoking family members. Furthermore, some toddlers also live near industrial areas or factories that potentially pollute their living environment. This situation is exacerbated by the low coverage of toddler growth monitoring, as reflected in the participation rate of toddler weighing in Padang City, which only reached 63%, and the fact that approximately 20% of toddlers in the Pagambiran Community Health Center's work area have not been monitored for their growth and development (Padang City Health Office, 2024). This low level of monitoring leads to delays in early detection of nutritional and growth problems in children.

Another study by Fauziah et al. (2021) at the Limo Community Health Center in Depok reported a stunting prevalence of 50.2% in toddlers aged 2-5 years. Meanwhile, Arifin et al. (2021) in Cirebon Regency reported a stunting prevalence of 47.8%. Both studies identified factors such as inadequate nutritional intake, unresponsive parenting, and limited access to health services and proper sanitation as contributors to stunting, particularly in families with lower-middle socioeconomic status.

Pagambiran Ampalu Nan XX Village is the most densely populated area in Lubuk Begalung District, with a population of 22,522 and a density of 4,373 people/km². Visits to the Pagambiran Community Health Center reach 75,290 per year, and a population growth rate of 0.87% per year indicates high population mobility, which can disrupt the continuity of monitoring child nutrition and growth (BPS Padang City, 2024).

Based on the WHO classification (2023), public health problems are categorized as low if the stunting prevalence is <20%, moderate if the stunting prevalence is 20-29%, high if the stunting prevalence is 30-39%, and very high if the stunting prevalence reaches ≥40%. Based on this classification, the work area of the Pagambiran Padang Community Health Center has a stunting prevalence that is in the very high category (43.9%). The high stunting prevalence indicates that the work area of the Pagambiran Padang Community Health Center faces a much more serious nutritional problem than the national and regional averages.

## CONCLUSION

The study's findings indicate that: 1) most mothers are between the ages of 20 and 35, have a secondary education, are housewives or unemployed, earn less than the

Padang City UMK, and have one or two children; 2) the majority of toddlers are between the ages of 24 and 35 months. Although there is a slight female predominance, the distribution of genders is fairly equal. The majority of children have a birth weight of ≥ 2500 grams and a birth length of ≥ 48 cm; 2) The prevalence of stunting in the working area of the Pagambiran Community Health Center, Padang City, was 43.9% (94 toddlers), indicating that the incidence of stunting is still relatively high; 3) There is a significant relationship between risk factors for fulfilling health needs (good health) and the incidence of stunting in toddlers in the working area of the Pagambiran Padang Health Center; 4) There is a significant relationship between risk factors for adequate nutrition and the incidence of stunting in toddlers in the working area of the Pagambiran Padang Health Center; 5) There is no significant relationship between the risk factors of responsive care and the incidence of stunting in toddlers in the working area of the Pagambiran Padang Health Center; 6) There is no significant relationship between the risk factors of early learning opportunities/early stimulation (opportunities for early learning) and the incidence of stunting in toddlers in the working area of the Pagambiran Padang Health Center; 7) There is a significant relationship between security and safety risk factors and the incidence of stunting among toddlers in the Pagambiran Padang Health Center working area; 8) There is a significant relationship between parenting patterns using the composite NCF approach and the incidence of stunting in toddlers in the working area of the Pagambiran Padang Health Center.

The primary determinant of child stunting in the Pagambiran Padang Health Center's operational region is the risk factor for proper nutrition.

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