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Research Article

ANALYSIS OF THE RELATIONSHIP BETWEEN FAMILY AND ENVIRONMENTAL FACTORS WITH FAMILIES AT RISK OF MOTHERHOOD STUNTED CHILDREN IN AGAM REGENCY AREA

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ABSTRACT

Background: Stunting prevalence in Agam Regency continues to rise, making it the highest in West Sumatra. This condition is influenced by various family factors—such as number of children, birth spacing, and age at marriage—as well as environmental factors like access to clean water and adequate sanitation. Therefore, this study aims to analyze the relationship between family and environmental factors and the risk of mothers giving birth to stunted children, as a basis for more targeted preventive interventions.
Methods: This quantitative study used a cross-sectional design and was conducted in Agam Regency from September 2024 to May 2025. A total of 398 families were selected from 67,429 families based on BKKBN data. Data were collected through questionnaires and analyzed using the Chi-Square test to assess variable relationships, and logistic regression to identify dominant factors influencing the risk of stunting in mothers.
Results: The study in Agam Regency found a significant relationship between various family and environmental factors and the risk of mothers giving birth to stunted children. Chi-Square tests showed that the number of children, birth spacing, extreme marriage age, source of drinking water, and sanitation were all significant ($p < 0.05$). Logistic regression identified the drinking water source as the most dominant factor ($p = 0.019$). These findings highlight the importance of access to clean water and proper sanitation in preventing stunting at the family level.
Conclusion: This study concludes that family and environmental factors significantly influence the risk of mothers giving birth to stunted children, with the source of drinking water identified as the most dominant factor. Therefore, improving access to clean water and providing nutrition education-particularly for pregnant women and mothers of children under five-is crucial in preventing stunting.

Keywords: Stunting, Family, Factor, Environment, Drinking Water, Centre

INTRODUCTION

Stunting is one of the chronic nutritional problems that is still a major challenge in public health development in Indonesia. Stunting is characterized by a child's height that is shorter than the standard age due to prolonged malnutrition, as well as recurrent infections, especially in the first 1000 days of life. This condition not only has an impact on physical growth, but also interferes with cognitive and motor development, as well as reducing the productivity and competitiveness of human resources in the future. At the global level, millions of children under five are stunted, and Indonesia is one of the countries with a high prevalence of stunting.

Based on data from the Indonesian Nutrition Status Study (SSGI), West Sumatra is included in the provinces with a fairly high stunting rate, with Agam Regency recorded as one of the regions with the highest prevalence reaching 13.9% in 2024. The incidence of stunting is very closely related to various factors, especially family and environmental conditions. Family factors such as the number of children, birth distance, and age at marriage affect the nutritional adequacy of children, while environmental factors such as the quality of drinking water sources and sanitation play a role in preventing infections that interfere with nutrient absorption. Given the complexity of the causes of stunting, a prevention approach needs to be carried out comprehensively and data-driven. Therefore, this study was conducted to analyze the relationship between family and environmental factors and the risk of mothers giving birth to stunted children in Agam Regency, as an effort to support the acceleration of stunting reduction in a targeted and evidence-based manner.

MATERIAL AND METHODS

This study uses a quantitative approach with a cross-sectional study design that aims to analyse the relationship between family and environmental factors with families at risk of mothers giving birth to stunted children in the work area of Agam Regency. The cross-sectional design was chosen because it allows to see the relationship between independent and dependent variables at a single time of data collection without having to do long-term follow-up. The research was carried out from September 2024 to May 2025, with a target population of 67,429 families recorded in the Family Data Collection (PK-24) by the Agam Regency BKKBN. Sampling was carried out using random sampling techniques, resulting in a total of

398 families as respondents who were considered to be representative of the population based on the distribution of territory. Data were collected through validated questionnaires, focusing on variables such as number of children, birth distance, age of marriage (either too young or too old), sanitation feasibility, and access to drinking water sources. All data obtained then goes through a series of processing stages that include editing, coding, entry, and cleaning to ensure the quality and accuracy of the data.

Data analysis was carried out in stages, starting from univariate analysis to describe the frequency distribution of each variable, bivariate analysis using the Chi-Square test to test the relationship between independent and dependent variables, and multivariate analysis with logistic regression to determine the most dominant factors for the risk of stunted mothers. The entire analysis was performed using the appropriate statistical software, and the significance level was set at a p- value < 0.05. The selection of this

method is based on the consideration that the factors causing stunting are complex and interact with each other, so a statistical analysis is needed that is able to identify the contribution of each factor simultaneously.

RESULTS

Univariate Analysis

Table 1. Frequency Distribution of Families at Risk of Mothers Giving Birth to Stunting Children in Agam Regency Working Area in 2025

Variable	Frequency (f)	Percentage (%)
Families at Risk of Giving Birth to *Stunting Children*		
Risk	220	55,3
No Risk	178	44,7

Based on table 1, it can be seen that from 398 respondents, more than half of 220 (55.3%) respondents are at risk of giving birth to stunted children, 178 (44.7%) respondents are not at risk of giving birth to stunted children.

Table 2. Frequency Distribution of the Number of Children in the Working Area of Agam Regency Year 2025

Variable	Frequency (f)	Percentage (%)
Number of Children		
Risk	210	52,8
No Risk	188	47,2

Based on table 2, it can be seen that out of 398 respondents, more than half of 210 (52.8%) respondents have a number of children at risk, 188 (47.2%) respondents have a number of children who are not at risk.

Table 3. Distribution of Frequency of Child Birth Distance in the Working Area of Agam Regency Year 2025

Variabel	Frequency (f)	Percentage (%)
Child's Birth Distance		
Risk	207	52
No Risk	191	48

Based on table 3, it can be seen that from 398 respondents, more than half of 207 (52%) respondents have a birth distance of children at risk, 191 (48%) respondents have a child's birth distance that is not at risk.

Table 4. Distribution of Too Young Marriage Frequency in the District Working Area Agam in 2025

Variabel	Frequency (f)	Percentage (%)
Married Too Young		
Risk	205	51,5
No Risk	193	48,5

Based on table 4, it can be seen that out of 398 respondents, more than half of 205 (51.5%) respondents married too young are at risk, 193 (48.5%) respondents married too young are not at risk.

Table 5. Distribution of Frequency of Marriage Too Old in the District Working Area Agam in 2025

Variable	Frequency (f)	Percentage (%)
Married Too Old		
Risk	180	45,2
No Risk	218	54,8

Based on table 5, it can be seen that out of 398 respondents, more than half of 218 (54.8%) respondents who are married too old are at risk, 180 (45.2%) respondents who are married too old are not at risk.

Table 6. Frequency Distribution of Drinking Water Sources in the District Working Area Agam in 2025

Variabel	Frequency (f)	Percentage (%)
Source of Drinking Water		
Not eligible	187	47
Proper	211	53

Based on table 6, it can be seen that out of 398 respondents, more than half of 211 (53%) respondents have a decent source of drinking water, 187 (47%) respondents have an unsuitable source of drinking water.

Table 7. Distribution of Sanitation Feasibility Frequencies in the District Working Area Agam in 2025

Variabel	Frequency (f)	Percentage (%)
Sanitation Eligibility		
Not eligible	192	48,2
Proper	206	51,8

Based on table 7, it can be seen that out of 398 respondents, more than half of 206 (51.8%) respondents have proper sanitation feasibility, 192 (48.2%) respondents have inappropriate sanitation feasibility.

Bivariate Analysis

Table 8. The Relationship between Children's Birth Distance and the Incidence of Mothers Giving Birth to Stunting Children in the Agam Regency Working Area in 2025

No	Child's Birth Distance	Incidents of Mothers Giving Birth to *Stunting Children*				Total		p value	OR
		Risk		No Risk					
		n	%	n	%	N	%		
1	Child's Birth							0,000	20,30
	Distance						100		7
	Risk	177	85,5	30	14,5	207			(12,1
	No Risk						100		36-
		43	22,5	148	77,5	191			33,98 1)

Based on table 8, it can be seen that from 207 people who have a spacing of birth to children at risk, there are 177 (85.5%) respondents who have the incidence of mothers giving birth to children with stunted children at risk and 30 (14.5%) respondents who have the incidence of mothers giving birth to children with stunting, are not at risk. Of the 191 people who had a non- risk childbirth distance, there were 43 (22.5%) respondents who had a risk of giving birth to a child and 148 (77.5%) respondents who had a risk of giving birth to a stunted child . Based on the results of the Chi-Square statistical test, a p value of 0.000 <0.05) can be concluded, so it can be concluded that there is a relationship between the child's birth distance and the incidence of mothers giving birth to stunted children in the work area of Agam Regency in 2025).

Table 9. The Relationship of Sanitation Eligibility with the Incidence of Mothers Giving Birth Stunted Children in the Working Area of Agam Regency in 2025

No	Sanitation Eligibility	Incidents of Mothers Giving Birth to *Stunting Children*				To al		p value	OR
		Risk		No Risk					
		n	%	n	%	N	%		
1	Sanitation eligibility								5,66 2
	Not Eligible	146	76	46					(3,6
	Proper	74	35,9	132	24 64,1	192 206	100 100	0,000	58- 8,76 3)

Based on table 9, it can be seen that out of 192 people who have sanitary eligibility at risk, there are 146 (76%) respondents who have the incidence of mothers giving birth to stunted children at risk and 46 (24%) respondents who have the incidence of mothers giving birth to children with stunted children are not at risk. Of the 206 people who had non-risk sanitation eligibility, there were 74 (35.9%) respondents who had the incidence of mothers giving birth to stunted

children at risk and 132 (64.1%) respondents who had the incidence of mothers giving birth to stunted children were not at risk. Based on the results of the Chi-Square statistical test, a p value of 0.000 can be concluded, so it can be concluded that there is a relationship between sanitation feasibility and the incidence of mothers giving birth to stunted children in the work area of Agam Regency in 2025).

Multivariate Analysis

Table 10. The Relationship Between Family Factors and the Environment with the Family

No	Variable	Wald	P value	Exp(B)	R. Square
1	Source of drinking water	4,416	0,019	14,000	0,036

In table 10, the results of the study were obtained the determinant of the most influential factor on the incidence of mothers giving birth to stunted children in the working area of Agam Regency in 2025 was the source of drinking water (p=0.019, exp B 14.00), with an R square value of 0.036 with the interpretation of the strength of this variable relationship of 36%. From the exposure of the analysis, it is known that the most influential factor on the incidence of mothers giving birth to stunted children in the work area of Agam Regency in 2025 is the source of drinking water (p- value 0.019).

DISCUSSION

Families at Risk of Mothers Giving Birth to Stunting Children in the Working Area of Agam Regency in 2025

Based on the results of the study, as many as 55.3% of respondents are classified as families at risk of giving birth to stunted children. This risk is influenced by a variety of factors, such as the mother's age is too young or old, the pregnancy gap is too close, the number of children is large, the mother's poor nutritional status, and access to health and sanitation services. Previous research has also shown that lack of nutritional intake since pregnancy, lack of breastfeeding and complementary feeding, and unhealthy environmental conditions are the main causes of stunting. Therefore, prevention efforts need to be focused on nutrition education, care for pregnant women, exclusive breastfeeding, as well as improving environmental sanitation and policy support from the government.

Number of Children in the Working Area of Agam Regency in 2025

Based on table 4.2, as many as 52.8% of respondents have a number of children who are classified as at risk of stunting. The large number of children in a family can affect the fulfilment of nutritional, health, and attention needs, especially if it is accompanied by a birth distance that is too close. This condition increases the risk of malnutrition in children, which can lead to stunting. Previous research has also shown that babies with low birth weight (BBLR) have a higher risk of stunting due to impaired nutrient absorption. Thus, the large number of children and BBLR are important interrelated factors in increasing the risk of stunting in children.

In addition, too many pregnancies and childbirth can endanger the reproductive health of the mother and have a direct impact on the condition of the fetus conceived. Large families also often face economic and resource limitations, resulting in a low quality of care and uneven distribution of

nutritious food. Therefore, controlling the number of children through family planning programs, as well as regular monitoring of maternal and child nutrition, is a strategic step in efforts to prevent stunting.

Birth Distance of Children in the Working Area of Agam Regency in 2025

Based on table 5.3, as many as 52% of respondents have a risk of birth interval, which is less than 24 months. Too close a birth distance can affect the recovery of the mother's health and reduce the opportunity to provide optimal care to the previous child. In addition, babies born with low birth weight (BBLR) have a higher risk of stunting, due to stunted growth and development from the womb, especially if the pregnancy occurs before the gestational age is sufficient. Research shows that BBLR is closely correlated with the incidence of stunting, accompanied by other factors such as infectious diseases, improper parenting, and unbalanced nutritional intake. Therefore, maintaining an ideal birth distance, providing nutritious food, and monitoring the health of mothers and children is very important to prevent stunting.

Getting Married Too Young in the Agam Regency Working Area in 2025

Based on table 4.4, as many as 51.5% of respondents were classified as married too young and at risk of giving birth to stunted children. Getting married and pregnant at the age of less than 20 years is a maternal risk factor because a woman's body is not reproductively mature, so it is prone to complications such as anaemia, KEK, and premature birth. This condition can adversely affect foetal growth and increase the risk of stunting. In addition, early marriage is generally related to the mother's low education and knowledge about nutrition, reproductive health, and proper parenting. This worsens the quality of childcare and the fulfilment of basic needs of children, especially during the First 1000 Days of Life which is very decisive for stunting prevention.

Getting Married Too Old in the Agam Regency Working Area in 2025

Based on table 5.5, as many as 54.8% of respondents are included in the category of married too old and at risk of giving birth to stunted children. Pregnancy at the age of over 35 years is classified as a high-risk pregnancy because it can cause various complications such as gestational hypertension, gestational diabetes, placenta previa, premature birth, and fetal growth inhibition. This condition can have an impact on the health of the mother and baby, including increasing the likelihood of babies being born with low body weight or stunting. Although in general, women who marry at an older age are considered more economically and psychologically prepared, from a medical point of view, pregnancy at an advanced age still has a significant risk. This shows that the age of the mother when married and pregnant, both too young and too old, is a maternal factor that must be considered in efforts to prevent stunting as a whole.

Drinking Water Sources in the Working Area of Agam Regency in 2025

Based on table 5.6, as many as 53% of respondents have a decent source of drinking water, while 47% still use an unsuitable source of drinking water. The quality of drinking water and environmental sanitation

have a great influence on children's health, especially in preventing stunting. An unclean environment can trigger various infectious diseases such as diarrhoea, worms, and ISPA that inhibit the absorption of children's nutrients. Although most of the respondents already have family toilets and dispose of garbage regularly, there are still some environmental conditions that are less than ideal, such as the existence of livestock pens close to home. Therefore, the provision of clean water, sanitary hygiene, and good environmental management are essential to support optimal growth and development of children.

Sanitation Feasibility in the Working Area of Agam Regency in 2025

Based on table 4.7, as many as 51.8% of respondents have proper sanitation, while 48.2% are still in unsanitary conditions. Sanitation is closely related to the incidence of stunting, as poor sanitation can trigger infectious diseases such as diarrhoea, worms, and environmental enteropathy that interfere with the absorption of children's nutrients. Access to healthy latrines and clean water is an important part of creating an environment that supports children's health. In addition, the practice of exclusive breastfeeding and the use of health services also play a major role in preventing stunting. Low maternal education and lack of knowledge about nutrition and health have exacerbated this condition. Therefore, improving the quality of sanitation, health education, and access to health services must be a priority to reduce stunting rates.

Bivariate Analysis

The Relationship between Children's Birth Distance and the Incidence of Mothers Giving Birth to Stunting Children in the Agam Regency Working Area in 2025

Based on table 5.8, it was found that 85.5% of mothers with a childbirth distance who were at risk of giving birth also gave birth to stunted children, while only 22.5% of mothers with no birth distance were at risk of experiencing the same. The results of the statistical test showed a significant relationship between the birth distance and the incidence of stunting (p value = 0.000). Too close birth distances can interfere with the recovery of maternal health and reduce the quality of childcare and nutritional fulfilment. This is further exacerbated if babies are born with BBLR who are prone to impaired nutrient absorption. Thus, setting birth spacing is one of the important efforts in preventing stunting in children.

The Relationship between the Number of Children and the Incidence of Mothers Giving Birth to Stunting Children in the Working Area of Agam Regency in 2025

Based on table 4.8, as many as 86.2% of mothers with the number of children at risk also experience stunting in their children, while only 20.7% of mothers with the number of children are not at risk of experiencing the same. The results of the statistical test showed a significant relationship between the number of children and the incidence of stunting (p value = 0.000). The large number of children in a family can limit the ability of parents to meet the optimal nutrition, attention, and health needs of children. This condition is exacerbated if the child is born with BBLR, which increases the risk of growth disorders. Therefore, regulating the number of children is one of the important factors in efforts to prevent stunting.

Marriage Relationship Too Young with the Incidence of Mothers Giving Birth to Stunting Children in the Agam Regency Working Area in 2025

Based on table 4.10, 205 people who married too young were at risk, there were 171 (83.4%) respondents who had the incidence of mothers giving birth to children Stunting at risk and 34 (16.6%) respondents to the incidence of mothers giving birth to children Stunting Risk-free. Of the 193 people who married too young, there were 49 (25.4%) respondents who had the incidence of mothers giving birth to children Stunting at risk and 144 (74.6%) respondents who had the incidence of mothers giving birth to children Stunting Risk-free.

Based on the results of statistical tests Chi-Square If the result is a p value of 0.000, it can be concluded that there is a The relationship between marriage too young and the incidence of mothers giving birth to children Stunting in the working area of Agam Regency in 2025).

Marriage Relationship Too Old with the Incidence of Mothers Giving Birth to Stunting Children in the Agam Regency Working Area in 2025

Based on table 5.11, 180 people who married too old were at risk of 144 (80%) respondents who had the incidence of mothers giving birth to children Stunting at risk and 36 (20%) respondents had a maternal incidence of childbirth Stunting Risk-free. Of the 210 people who married too old, there were no risks, 76 (34.9%) person Respondents to the Incidence of Mothers Giving Birth Stunting at risk and 142 (65.1%) respondents to the incidence of mothers giving birth to children Stunting Risk-free.

Based on the results of statistical tests Chi-Square If the result is a p value of 0.000, it can be concluded that there is a The relationship between being married is too old and the incident of mothers giving birth to children Stunting in the working area of Agam Regency in 2025).

The Relationship between Drinking Water Sources and the Incidence of Mothers Giving Birth to Stunting Children in the Working Area of Agam Regency in 2025

Based on table 4.12, it was found that 78.1% of mothers with drinking water sources who were at risk also experienced stunting in their children, while only 35.1% of mothers with drinking water sources were not at risk of experiencing the same. The results of the Chi-Square test showed a significant relationship between drinking water sources and stunting incidence (p = 0.000). The availability of clean drinking water is essential in preventing infections and supporting maternal and child health. Water that is not suitable for consumption can cause disease, interfere with nutrient absorption, and have an impact on children's growth and development. Therefore, access to safe and clean drinking water is an important factor in stunting prevention.

The Relationship between Sanitation Feasibility and the Incidence of Mothers Giving Birth to Stunting Children in the Agam Regency Working Area in 2025

Based on table 4.13, it was found that 76% of respondents with inadequate sanitation experienced stunting in their children, while only 35.9% in the group with proper sanitation experienced the same. The results of the Chi-Square test showed a significant relationship between sanitation

feasibility and stunting incidence (p = 0.000). Poor sanitation, such as the unavailability of healthy toilets and an unclean environment, increases the risk of infection that has an impact on impaired nutrient absorption and child growth. Therefore, good environmental sanitation is an important aspect in efforts to prevent stunting in toddlers.

Multivariate Analysis

The Relationship Between Family and Environmental Factors with Families at Risk of Mothers Giving Birth to Stunting Children in the Agam Regency Working Area in 2025

Based on table 4.16, the most influential factor on the incidence of mothers giving birth to stunted children in Agam Regency in 2025 is the source of drinking water with a value of p = 0.019 and exp B = 14.00. This suggests that the quality of drinking water has a major influence on the risk of stunting, in line with previous theories and research that state that poor sanitation, including improper water, increases the risk of infection and impaired nutrient absorption in children. Therefore, the availability of clean drinking water is one of the main determinants in stunting prevention.

CONCLUSION

1. There is a significant relationship between the mother's marriage age (too old) and the incidence of mothers giving birth to stunted children.
2. Too close birth distance is significantly related to the risk of stunting in children.
3. Too many children in one family tends to increase the risk of stunting.
4. Unsuitable drinking water sources have a significant relationship with the incidence of stunting, where poor water quality increases the likelihood of children experiencing stunting.
5. Improper environmental sanitation (including latrines, landfills, and wastewater) also contributes to an increased risk of stunting.
6. The results of the multivariate analysis showed that the most dominant factor affecting the incidence of stunting was the source of drinking water, with a value of p = 0.019 and exp B of 14.00.
7. The importance of maternal health services and nutrition education is also an aspect that must be considered in efforts to prevent stunting in the community.

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