



**ANALYSIS OF FACTORS IN EARLY CHILDHOOD STUNTING MITIGATION IN
DISASTER-PRONE AREAS OF SUKABUMI REGENCY**

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ABSTRACT

Sukabumi Regency is a disaster-prone area. Throughout 2024, Sukabumi Regency experienced 787 landslides, 396 floods, and 49 earthquakes. In the health sector, Sukabumi Regency also faces a fairly serious stunting problem. The 2023 Indonesian Health Survey (SKI) found that stunting prevalence reached 27%, making it one of the top five districts with the highest stunting prevalence in West Java Province. The purpose of this study is to examine the risk variables that contribute to stunting mitigation. stunting in early childhood in disaster-prone areas of Sukabumi Regency. The study population consisted of all mothers with children aged 0–59 months residing in the study area. The sample size was calculated using the Lemeshow formula based on a stunting prevalence of 27% in Sukabumi Regency, resulting in a total of 303 respondents. A two-stage probability sampling method was applied, with sample allocation across locations determined using proportional random sampling, followed by respondent selection through cluster random sampling within each area. This study employed a correlational design with a cross-sectional approach. Data were collected through structured interviews using a standardized questionnaire. Univariate analysis was performed using frequency distributions, bivariate analysis employed the chi-square test, and multivariate analysis was conducted using multiple logistic regression. 41.9% of respondents had mitigation. stunting is less, 57.4% socioeconomic is less, 22.1% said access to health services is difficult to reach, 47.5% family food security is less and 61.7% family sanitation is less good, the results of the bivariate analysis showed that there is a relationship between food security, socioeconomic, access to health services, family sanitation towards mitigation stunting with p value $(0.000-0.015) < 0.05$, multivariate analysis found that food security is the dominant factor influencing stunting stunting where , families with less food security are 10.6 times more likely to experience mitigation Lack of stunting . Conclusion: Mitigation Stunting in early childhood in disaster-prone districts in Sukabumi Regency is influenced by family sanitation, food security, socioeconomic factors, and accessibility to health services. Food security is a dominant factor influencing mitigation stunting.

Keywords: access to health services; family food security; family sanitation; mitigation stunting; socio-economic

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INTRODUCTION

In Indonesia, stunting , a condition of growth failure due to chronic malnutrition during the first 1,000 days of life, remains a serious health problem. This condition increases the risk of non-communicable diseases in adulthood, and inhibits physical growth, cognitive development, and economic productivity (Utami, AS, 2023). According to the 2024 Indonesian Nutritional Status Survey (SSGI), the prevalence of stunting in Indonesia was 20.1%, still significantly higher than the government's target of 14% (Ministry of Health, 2024).

Stunting situation is further exacerbated in disaster-prone areas, where vulnerability to food shortages, poor sanitation, and limited access to health services can significantly increase the risk of stunting . Sukabumi Regency is one of the disaster-prone areas, particularly earthquakes, landslides, and floods, due to the Cimandiri Fault . (BNPB, 2025). Throughout 2024, Sukabumi Regency experienced 787 landslides, 396 floods, and 49 earthquakes, which caused severe infrastructure damage, complicating access to health facilities and food. (West Java Regional Development Planning Agency, 2024). In the health sector, Sukabumi Regency also faces a fairly serious stunting

problem. According to the 2023 Indonesian Health Survey (SKI), this regency is one of the five largest regencies in West Java Province with the highest stunting rate, at 27%. (RRI, 2024)

Previous research has identified numerous risk factors for stunting. Post-earthquake case studies in Palu, Sigi, and Donggala showed high rates of stunting, underweight, and wasting (48.5%, 32.1%, and 13.7%, respectively). Low family food access is caused by job losses, agricultural land damage, and post-disaster economic disruption (Taufiqurrahman, 2021). Poor sanitation and hygiene were identified as significant factors causing stunting in another study conducted in the coastal area of Demak, which is vulnerable to tidal flooding (Utami, AS, 2023). This aligns with findings that clean water availability, hygiene, and sanitation are indirect factors contributing to stunting in water crisis areas. (Angkat, A. H, 2023). In addition, low maternal education and family income correlate with a lack of understanding of balanced nutrition and limitations in providing nutritious food, which can potentially lead to stunting. (FAO, 2022). Research in volcanic eruption disaster areas also shows that low maternal education is a dominant risk factor for stunting. (Abiddin, AH, 2024). Other studies also state that disaster-related infrastructure damage often reduces the availability of clean water and sanitation, which increases the risk of infectious diseases such as diarrhea, which ultimately lead to malnutrition and stunted growth in children. (UNICEF, 2022). In disaster-affected areas, food availability is disrupted due to distribution disruptions, damage to agricultural land, and rising food prices, which directly affect children's nutritional intake. (WHO, 2020). Access to health services is crucial in preventing stunting. Many health facilities were damaged or difficult to access after the disaster, hampering the management of malnutrition, antenatal care, distribution of nutritional supplements, and immunization, which are also underlying factors. factors in the incidence of stunting (Nisa, SK, 2021).

This phenomenon gives rise to the research question of whether risk variables, including socio-economic status, family sanitation, food security, and access to health services, are associated with stunting mitigation among young children in disaster-prone areas of Sukabumi Regency. Accordingly, this study aims to analyze the relationships between socio-economic status, family sanitation, food security, and access to health services and stunting mitigation among young children in disaster-prone areas of Sukabumi Regency. A comprehensive understanding of these dynamics is expected to provide a foundation for formulating more effective and adaptive stunting mitigation strategies.

METHOD

This study was conducted in Nyalindung and Pabuaran Subdistricts, Sukabumi Regency. The study population consisted of all mothers with children aged 0–59 months residing in the study areas. The sample size was determined using the Lemeshow formula based on a stunting prevalence of 27% in Sukabumi Regency, resulting in a total of 303 respondents. Sampling was performed using a two-stage probability sampling method. Sample allocation through proportional random sampling resulted in 96 respondents from Cijangkar Subdistrict and 207 respondents from Pabuaran Subdistrict, followed by respondent selection within each area using cluster random sampling. Data were collected through structured interviews using a standardized questionnaire. Descriptive statistical tests with frequency distributions are used for univariate analysis, while chi square is used for bivariate testing to ensure the relationship between independent factors and dependent variables. In addition, to determine the dominant risk variable, multivariate testing using logistic regression test is used.

RESULT

Overview of Stunting Mitigation in Disaster -Prone Areas Regency Sukabumi

From the diagram 1, it is stated that of the 303 respondents, there were 127 people (41.9%) mothers of toddlers who had mitigation stunting in the less good category

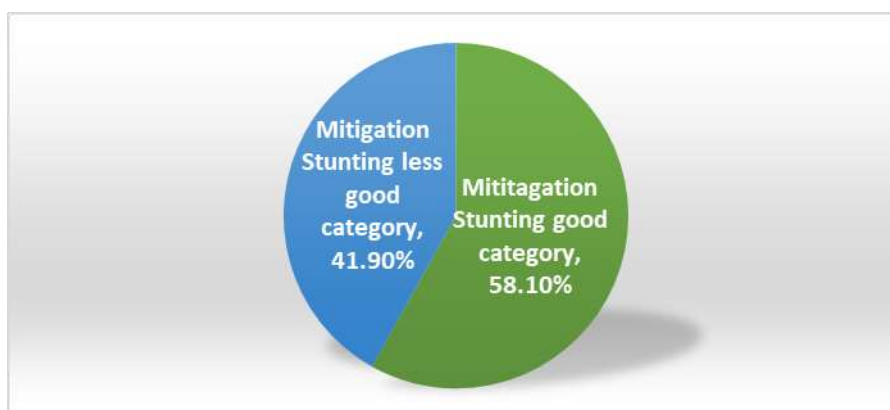


Diagram 1. Mitigation frequency stunting in early childhood in disaster-prone areas of Sukabumi Regency

Overview of related factors with Stunting Mitigation .

Food security, family hygiene, access to health services, and socioeconomic status are examples of independent factors. The following is an overview:

Table 1

Frequency distribution of food security, family sanitation, access to health services and socio-economics (n=303)

Variables	f	%
Food security		
Not good	144	47.5
Good	159	52.5
Family Sanitation		
Not enough	187	61.7
Good	116	38.3
Access to Health Services		
Hard to reach	67	22.1
Easy to reach	236	77.9
Socio-Economic		
Not enough	174	57.4
Good	129	42.6

The results of the study showed that 144 (47.5%) respondents had poor food security, 187 (61.7%) respondents were included in the family sanitation category, 67 (22.1%) respondents stated that access to health services was difficult to reach and 174 (57.4%) respondents were included in the socio-economic category.

Analysis Results Bivariate with the *Chi-square* test

Results of the analysis of the relationship between Family Sanitation and Mitigation Stunting was obtained from 187 respondents whose family sanitation was lacking, 89 (47.6%) had mitigation stunting, while of the 116 respondents with good family sanitation, 78 (67.2%) had mitigation Good stunting. Family hygiene and stunting reduction are interrelated, according to statistical test results showing a p-value of 0.015. Furthermore, this study yielded an OR of 1.864, indicating that households with poor sanitation are 1.9 times more likely to experience stunting mitigation. poor stunting compared to households with good sanitation. Based on the examination of the relationship between food security and stunting mitigation, 129 (81.1%) of 159 respondents with very good food security had good stunting mitigation, while 97 (67.4%) of 144 respondents with poor food security had lower stunting mitigation. There is a relationship between family food security and stunting mitigation. stunting, according to the results of statistical tests, which produced a p-value of 0.000. Families with low food security are 8.9 times more likely to have stunting lower stunting compared to families with good food security, based on the OR analysis value of 8.874.

Table 2
Distribution respondents based on independent variables and Mitigation Stunting

Variables	Mitigation Stunting				Total		P value	OR (95% CI)
	Not enough		Good					
	f	%	f	%	f	%		
Family Sanitation								
Not enough	89	47.6	98	52.4	187	100	0.015	1,864 (1,151 - 3,020)
Good	38	29.4	78	67.2	116	100		
Food security								
Not enough	97	67.4	47	32.6	144	100	0,000	8,874 (5,232 - 15,052)
Good	30	18.9	129	81.1	159	100		
Access to Health Services								
Hard to reach	51	76.1	16	23.9	67	100	0,000	6,711 (3,594- 12 , 530)
Easy to reach	76	32.2	160	67.8	236	100		
Socio-Economic								
Not enough	86	49.4	88	50.6	174	100	0.003	2,098 (1,304-3,373)
Good	41	31.8	88	68.2	129	100		

Mitigation Stunting was significantly correlated with access to health services (p=0.000). Families reporting difficult access were 6.7 times more likely to experience mitigation. less stunting, based on the odds ratio (OR=6.711)

Results of the analysis of the relationship between socio-economics and mitigation Stunting was obtained from 174 respondents in the low socio-economic category, 86 (49.4%) had mitigation. stunting is lacking, while of the 129 respondents whose socio-economic category is good, 88 (68.2%) have mitigation stunting . The statistical test results showed a p-value of 0.003, which indicates that socioeconomic status and mitigation stunting are interrelated. Furthermore, this study yielded an OR of 2.098, indicating that families in low socioeconomic groups are 2.1 times more likely to have mitigation adequate stunting compared to families in the very good socioeconomic category.

Analysis Results Multivariate

Multiple logistic regression is a statistical test used due to the categorical nature of the independent and dependent variables. To be able to estimate multiple logistic regression coefficients simultaneously, each variable in the model is considered significant.

Bivariate Selection

multivariate model includes variables that are substantively significant but have a p-value greater than 0.25. Direct logistic regression tests are used for bivariate selection

Table 3.

Analysis of Factors Influencing Mitigation Stunting in Early Childhood		
Variables	P value	Information
Family Sanitation	0.011	Candidate
Food security	0,000	Candidate
Access to Health Services	0,000	Candidate
Socio-Economic	0.002	Candidate

Based on table 3, it is found that the variables of family sanitation, food security, access to health services and socio-economics are suitable for inclusion in multivariate modeling .

Modeling Multivariate

All four independent variables were tested simultaneously in multivariate modeling . Variables with a p-value greater than 0.05 were excluded. Starting with the variable with the highest p-value, the analysis was performed stepwise until a p-value less than 0.05 was found. Changes in the OR were

then recorded. Variables were reinserted if the OR was greater than 10%. The initial multivariate analysis is shown in the following table.

Table 4.
Multivariate Modeling With Four Selected Variables Against Mitigation Stunting

Variables	B	Wald	P value	OR	Change in OR (%)
Family Sanitation	0.623	6,403	0.011	1,864	
Food security	2,183	65,587	0,000	8,874	
Access to health services	1,904	35,699	0,000	3,594	
Socio-Economic	0.741	9,341	0.002	1,304	
Food security	2,358	58,954	0,000	10,567	4.7
Access to Health Services	1,974	27,395	0,000	7,197	3.77
Socio-Economic	0.982	10,564	0.001	2,667	4.08

Based on table 4 generated through logistic regression modeling, it can be seen that removing the variable with the highest p-value—family sanitation—does not result in a change in OR >10%. Therefore, family sanitation is removed from the modeling. Furthermore, when socioeconomic factors are removed, there is a change in OR >10%. Food security, access to health care, and socioeconomic status have been shown to be three factors associated with mitigation. stunting from multivariate analysis using logistic regression.

Table 5
Final Multivariate Analysis Model

Variables	B	Wald	P value	OR	95% CI
Food security	2,358	58,954	0,000	10,567	5,789-19,290
Access to Health Services	1,974	27,395	0,000	7,197	3,437-15,069
Socio-Economic	0.982	10,564	0.001	2,667	1,477-4,824

Based on table 5, the results show that the food security variable is related to mitigation. stunting with *P value* = 0.000 and OR = 10.567, after being controlled by the variables of access to health services and socio-economics. The variable of access to health services is related to mitigation. stunting with *P value* = 0.000 and OR = 7.197, after managing food security and socio-economic factors, as well as socio-economic factors related to stunting management (*P value* = 0.001 and OR = 2.667). Table 5 also states that the food security variable is the dominant variable related to mitigation . stunting after control by access to health and socio-economic services, because it has the highest OR, namely 10.567, meaning that families with good food security will have a 10.6 times greater chance of experiencing mitigation. good stunting compared to families with less food security.

DISCUSSION

The purpose of this study was to examine the variables influencing stunting mitigation in early childhood in disaster-prone districts of Sukabumi Regency. Findings indicate that food security, access to health services, family sanitation, and socioeconomic conditions are significantly associated with stunting mitigation. stunting , with food security as the most dominant factor. The following discussion elaborates on the findings of this study, supported by theory and previous research.

Food Security as a Dominant Factor in Stunting Mitigation

Research result show that resilience food is the most dominant factor that influences stunting mitigation, where families with resilience food Good own 10.6 times more chance big For do effective stunting mitigation . Resilience food is one of the determinant important nutritional status children, including availability food , accessibility food , utilization food and stability food in House ladder . According to FAO (2020), resilience food is one of the foundation main in prevention malnutrition chronic . When the house ladder No stable in provision food , children become more prone to experience lack ongoing nutrition become stunted. A study by Rachmi et al. (2021) found that children living in families with resilience food low own double the risk big experiencing stunting compared to those who live in family with resilience food Good .

Rahman et al.'s (2020) research in Bangladesh also confirmed that resilience food play a role big in nutritional status toddlers , where the affected areas are disaster or own limitations distribution food show prevalence of stunting is higher high . This is relevant with condition Regency Sukabumi , which in 2024 experienced more of 1,200 incidents disaster like land landslides , floods , and earthquakes . Disasters the cause disturbance distribution food , damage market access , and limitations food nutritious . Numerous studies have demonstrated that household food security is a key determinant of child nutritional status, including the occurrence of stunting. Household food security not only reflects a family's ability to ensure adequate, safe, and nutritious food but is also strongly influenced by external factors such as socio-economic conditions, poverty levels, geographic environment, and vulnerability to natural disasters. Smith and Haddad (2015) emphasized that socio-economic and environmental determinants make substantial contributions to improvements in child nutritional status at the global level. Furthermore, a systematic review by Bukusuba et al. (2018) and a study by Osei et al. (2017) reported that households experiencing food insecurity have a higher risk of stunting among young children. These findings reinforce the importance of family- and household-based interventions as crucial strategies for stunting mitigation, particularly in disaster-prone areas..

Access to Health Services and Its Impact to Stunting Mitigation

Access to services difficult health reachable found in 22.1% of respondents and was related significant with stunting mitigation . Health access covers availability facilities , distance , conditions geographical , transportation , and ability family access service essential like immunization , monitoring growth and care disease infection . Research by Sari et al. (2022) suggests that that access service good health become factor protective against stunting because allows detection early problem nutrition and intervention immediately in toddlers . Research This in line with findings of Shrestha et al. (2020) in Nepal, which showed that toddlers living in the area with access service health limited own the risk of stunting is twice as high tall compared to toddler who lives near facility health. Condition geographical Sukabumi is prone to disasters landslide cause some areas are isolated and difficult to reach reachable vehicles . Research (Utami, 2023) confirms that the area facing obstacle mobility Because disaster tend own coverage service health low maternal and child health , which has an impact on increasing stunting risk . Access to services health in context stunting mitigation also includes education Mother about pattern Eat children , exclusive breastfeeding , complementary feeding, care cleanliness children , and prevention disease infection . Therefore , access minimal health only hinder service medical , but also transmission knowledge important health For stunting mitigation .

Sanitation Family as Determinant Important Stunting Mitigation

Study This find that 61.7% of families own sanitation bad , and conditions the relate significant with stunting mitigation . Sanitation bad increase risk infection recurring , especially diarrhea , infection parasites , and environmental enteric dysfunction (EED), which can hinder absorption nutrition . According to Humphrey (2019), exposure polluted environment feces man is one of the track the most powerful biological factor that causes stunting. In the stunting pathway model , it explain that growing child in environment sanitation bad experiencing EED, namely inflammation of the intestine that causes malabsorption nutrition although intake food sufficient .

Research result This in line with research conducted in Indonesia by Torlesse et al. (2018) which shows that stunting is more Lots happened at home stairs that are not own access sanitation adequate . Meanwhile UNICEF research (2021) shows that intervention sanitation can reduce stunting burden of up to 15–20% if integrated with intervention nutrition . In the context of Regency Sukabumi , disaster like flood often damage means sanitation , pollute water sources , and improve risk infection . This is strengthen importance sanitation in stunting mitigation in the region vulnerable disaster .

Socio- Economic and Its Impact to Stunting Mitigation

As many as 57.4% of respondents be at the level social economy low . Capacity family For provide food healthy , get service health , improve facility sanitation , and provide maintenance best influenced by social status low economy . According to study Akambi et al . (2017), house ladder earning low more Possible experience malnutrition chronic , and social status economy is one of the the most consistent characteristics related with stunting. Stunting is more general occurs in children from House ladder earning low compared to children from family earning high , according to survey national program conducted by the Indonesian Ministry of Health in 2021. Social economy often considered as factor root cause in UNICEF framework on determinants of stunting. In the context of area vulnerable disaster , poor families are more prone to lost source income , assets , and access need basic , so that the risk of stunting is increasing increased . This is explain Why stunting mitigation in study This correlated significant with factor social economy .

CONCLUSION

Food security, family hygiene, access to health services, and socio-economic conditions are factors related to mitigation. stunting in early childhood in disaster-prone districts in Sukabumi Regency. The most important element is food security; households with adequate food security are 10.6 times more likely to successfully mitigate stunting.

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