
Analysis of Contributing Factors to Stunting in Poso Regency: A Perspective from the Special Stunting Handling Index

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ABSTRACT

Introduction: The prevalence of stunting in children in Indonesia, including Poso Regency, remains relatively high despite a decrease in recent years. This study aims to analyze factors associated with stunting in Poso Regency.

Methods: This study employed a cross-sectional analytical method with a sample size of 250 mothers and their children under 2 years old, using structured questionnaires and direct measurements to collect data. Univariate analysis, chi-square tests and binary logistic regression were performed with a final report of adjusted odds ratios (AORs) and 95% confidence intervals (CI). All of the analyses used Stata version 15.

Results: Results indicate a significant association between stunting and the child's gender, maternal education, immunization, and breastfeeding. Boys face a 2.3 times higher risk of stunting, while children of mothers with primary education have a 4.7 times higher risk compared to those with higher education. Non-immunized and non-breastfed children also exhibit significantly higher stunting risks.

Conclusion: The study underscores the impact of factors such as the child's sex, maternal education, immunization, and breastfeeding on stunting in Poso Regency. The study emphasizes the need for targeted educational programs by healthcare professionals, policy-driven nutritional support initiatives, and community-based awareness campaigns to effectively address stunting in Poso Regency.

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INTRODUCTION

Within 5 (five) years, Indonesia has succeeded in reducing the stunting rate from 37.2% in 2013 (Risksdas 2013) to 30.8% in 2018 (1,2). The stunting rate in Central Sulawesi has decreased. Based on Risksdas 2013 data, stunting prevalence of 41% decreased to 32.3% in 2018 (2,3). Between those years, Nutritional Status Monitoring (PSG) was also held where in 2016 the prevalence of stunting was 32% and in 2017 it rose to 36.1% (4,5). In Poso Regency, the prevalence of stunting in 2013 was 39.4% and decreased to 26.2% in 2018 (2,3). One study conducted in South Lore sub-district, Poso Regency, showed a stunting prevalence of 34.8% (6). Despite the decline, this figure is still above the threshold set by WHO, which is 20% (7). In the 2020-2024 RPJMN, the government has targeted the stunting rate to decrease to 14 percent by 2024 (8,9).

The stunting emergency can become a burden on the state if it continues, especially since Indonesia will pass the demographic bonus phase in 2035. Because, besides being short, stunting toddlers also have other health problems that are no less worrying. One of the most serious is the complete development of brain neurons (10). The problem of stunting is still seen as a result of malnutrition, so the handling is still dominated by institutions and service providers in the health sector, but in 2017 it was decided that reducing stunting is important to be carried

out with a multi-sector approach through synchronization of national, local and community programs at the central and regional levels (11).

The launching of the National Strategy for the Acceleration of Stunting and Stunting Prevention as one of the priorities in the national development program shows the government's great attention to stunting prevention and reduction (12). The Special Index for Stunting Handling (IKPS) is used as an instrument to evaluate various stunting handling programs in accordance with the mandate of the Draft Presidential Regulation. IKPS is part of monitoring and evaluation as one of the indices that can be monitored regularly to see the implementation of programs related to stunting handling (13). Currently available is only up to the district level, therefore there needs to be an evaluation of the IKPS up to the village level.

In light of the Minister of National Development Planning/Bappenas Decree No. 10 of 2021, which identifies Poso Regency as a critical focus for integrated stunting reduction interventions in 2022 (14), this study aims to delve deeply into the factors contributing to the high incidence of stunting within the region. Despite Indonesia's significant national efforts to combat stunting, Poso Regency remains a locus of concern, with stunting rates persisting above the national average. This pressing challenge highlights the imperative for accurate data validation and the mobilization of support from various stakeholders, including universities, to ensure the effectiveness of stunting reduction activities. Leveraging the knowledge of the Special Stunting Handling Index (IKPS) down to the village level promises targeted interventions that are sensitive and precise. This research, focusing on analyzing the determinants of stunting in Poso Regency, seeks not only to fill the existing gaps in our understanding of its unique contributing factors but also to aid in the formulation of more effective, evidence-based interventions. By integrating local initiatives with broader national and global efforts to address stunting, our findings aim to inform policy and community-based strategies, ultimately improving child health outcomes in Poso Regency and potentially serving as a model for similar regions worldwide.

METHOD

This research employs an analytical cross-sectional approach conducted in Poso District from July to September 2023. The study population includes mothers with children under 2 years old, selected using cluster random sampling, totaling 250 respondents. The dependent variable in this study is the incidence of stunting, while the independent variables are maternal characteristics, immunization, childbirth assistance, family planning, exclusive breastfeeding, drinking water, sanitation, food insecurity, insufficiency in food consumption, utilization of National Health Insurance (JKN), and Families receiving government assistance. This research questionnaire was adopted from the Susenas questionnaire in 2019 and Riskesdas 2018 (15–17). The research questionnaire can be seen at the following link: <https://ee.kobotoolbox.org/x/QQy1n1Ko>

Data collection using an android-based Open Data Kit (ODK) application with Kobotoolbox server (18,19). Determination of nutritional status using the WHO antro application (20). Data analysis was performed using STATA version 15 (21). Data was analyzed through three stages: univariate, in the form of frequency distribution, bivariate, with chi-square test, and multivariate, using logistic regression. Ethical approval for this research was granted by the Ethics Commission of Poltekkes, Ministry of Health Palu, under approval number 0035/KEPK-KPK/V/2022.

RESULTS

Research data collection has been carried out in 3 sub-districts in Poso Regency. The amount of data that has been collected is 250 respondents. The interim results of this study are:

Table 1. Results of Univariate analysis

Variables	frequency	%
Age		
<6 months	50	20.0
6-11 months	76	30.4
12-23 months	124	49.6
Sex of Child		

Variables	frequency	%
Boys	121	48.4
Girls	129	51.6
Mother's Education		
Higher	77	30.8
Secondary	120	48.0
Primary	53	21.2
Mother's Work		
work	85	34.0
does not work	165	66.0
Immunization		
no	46	18.4
Yes	204	81.6
Childbirth in Health Facilities		
No	2	0.8
Yes	248	99.2
Use of Contraceptive		
No	83	33.2
Yes	167	66.8
Breastfeeding		
No	104	41.6
Yes	146	58.4
Access to adequate drinking water		
No	0	0.0
Yes	250	100.0
Latrines available		
No	8	3.2
Yes	242	96.8
The mother felt that the food consumed was not enough for the family		
No	234	93.6
Yes	16	6.4
JKN Ownership		
No	110	44.0
Yes	140	56.0
Families receiving government assistance		
No	190	76.0
Yes	60	24.0
Stunting		
Yes	55	22.0
No	195	78.0

Table 1 shows that most respondents have children 12-23 months (49.6%), female (51.6%). Based on maternal characteristics, the majority of respondents were high school graduates (48.1%) and not employed (64.9%). Immunization status 81.6% and 66.8% of respondents are contraceptive users. Breastfeeding is only 58.4%, access to 100% decent drinking water and the availability of latrines is 96.8%. There are 6.4% of respondents feel that the food consumed is not enough for the family. The majority of respondents do not have national health insurance (JKN) (56%) and 24.0% receive government assistance. The incidence of stunting is 22.0%.

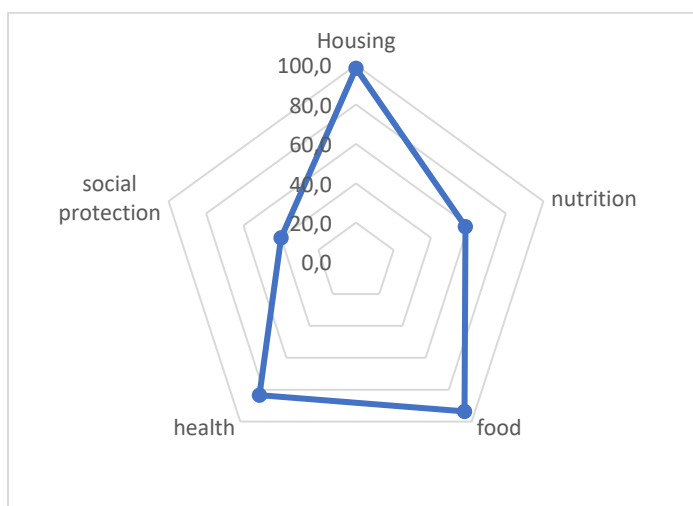


Figure 1. IKPS Poso District

The housing aspect has a very high IKPS value, which is 98.4. This indicates that in 2023, housing conditions in the context of handling stunting are very good. The nutritional aspect has an IKPS value of around 58.4. Although this value is not as good as the housing aspect, there is still potential for improvement. The food aspect has a very high IKPS value, which is 93.6. This shows that by 2023, access and availability of adequate and nutritious food may have been well met. The health aspect has a IKPS value of around 83.4, indicating that the health sector also has good performance in the context of handling stunting. The social protection aspect has a lower IKPS value, which is 40.0. This indicates that in 2023, there is potential for improvement in social protection efforts in the context of addressing stunting.

Table 2. bivariate analysis

Variables	Stunting Events				P value
	Yes		No		
	n	%	n	%	
Age					
<6 months	10	20.0	40	80.0	0.363
6-11 months	21	27.6	55	72.4	
12-23 months	24	19.4	100	80.6	
Sex of Child					
Boys	32	26.4	89	73.6	0.100
Girls	23	17.8	106	82.2	
Mother's Education					
Higher	15	19.5	62	80.5	0.059
Secondary	22	18.3	98	81.7	
Primary	18	34.0	35	66.0	
Mother's Work					
work	12	14.1	73	85.9	0.031
does not work	43	26.1	122	73.9	
Immunization					
no	32	69.6	14	30.4	<0.001
Yes	23	11.3	181	88.7	
Childbirth in Health Facilities					
No	1	50.0	1	50.0	0.337
Yes	54	21.8	194	78.2	
Use of Contraceptive					
No	15	18.1	68	81.9	0.291

Variables	Stunting Events				P value
	Yes		No		
	n	%	n	%	
Yes	40	24.0	127	76.0	
Breastfeeding					
No	36	34.6	68	65.4	<0.001
Yes	19	13.0	127	87.0	
Access to adequate drinking water					
No	0	N/A	0	N/A	N/A
Yes	55	22.0	195	78.0	
Latrines available					
No	1	12.5	7	87.5	0.510
Yes	54	22.3	188	77.7	
The mother felt that the food consumed was not enough for the family					
No	48	20.5	186	79.5	0.030
Yes	7	43.8	9	56.3	
JKN Ownership					
No	27	24.5	83	75.5	0.389
Yes	28	20.0	112	80.0	
Families receiving government assistance					
No	42	22.1	148	77.9	0.943
Yes	13	21.7	47	78.3	

Table 2 indicates that there is no significant difference in the prevalence of stunting across different age groups, suggesting a relatively uniform distribution of stunted children among these groups. However, notable disparities emerge when examining gender differences. Boys exhibit a higher proportion of stunting (26.4%) compared to girls (17.8%), although the difference does not reach statistical significance ($p=0.100$).

Maternal education level shows a significant association with stunting. Children of mothers with primary education have a higher prevalence of stunting (34.0%) compared to those with mothers holding secondary (18.3%) or higher (19.5%) education levels ($p=0.059$). Furthermore, there is a significant disparity in stunting incidence based on maternal occupation. Children of non-working mothers have a higher prevalence of stunting (26.1%) compared to those with working mothers (14.1%) ($p=0.031$).

Immunization plays a crucial role, as children who did not receive immunization exhibit a significantly higher prevalence of stunting (69.6%) compared to those who received immunization (11.3%) ($p<0.001$). No significant differences were observed based on place of birth, access to clean water, JKN ownership, or receipt of assistance.

The significance of breastfeeding is evident, with children who did not receive breast milk showing a higher prevalence of stunting (34.6%) compared to those who were breastfed (13.0%) ($p<0.001$). Additionally, families perceiving insufficient food for the entire family had a significantly higher proportion of stunted children (43.8%) compared to those who felt food was sufficient (20.5%) ($p=0.030$). Overall, these findings underscore the multifaceted nature of factors contributing to stunting in the studied population.

Table 3. Multivariable analysis

Variables	P value	OR	95%CI OR	
			lower	upper
Sex of Child				
Boys	0.033	2.3	1.1	5.2
Girls		1.0		
Mother's Education				
Higher		1.0		
Secondary	0.005	3.9	1.5	9.9
Primary	0.004	4.7	1.6	13.7

Immunization				
no	<0.001	23.5	9.6	57.7
Yes		1.0		
Breastfeeding				
No	0.012	2.7	1.2	5.7
Yes		1.0		

Table 3 shows that there is a significant relationship between sex and the incidence of stunting. Boys have a 2.3 times higher risk of being stunted compared to girls (OR= 2.3). A 95% confidence interval for OR (1.1 - 5.2) indicates that this risk is a possible interval with a 95% confidence level. There is a significant relationship between mother’s education and the incidence of stunting. Children of mothers with primary education had a 4.7 times higher risk of being stunted compared to children of mothers with higher education (OR= 4.7). Children of mothers with secondary education also had a higher risk (OR= 3.9) compared with children of mothers with higher education.

There is a very significant relationship between immunization and the incidence of stunting. Children who did not receive immunization had a 23.5 times higher risk of being stunted compared to those who received immunization (OR= 23.5). There is a significant relationship between breastfeeding and the incidence of stunting. Children who did not receive breast milk had a 2.7 times higher risk of being stunted compared to those who received breast milk (OR= 2.7).

From this table, it can be concluded that sex of child, mother’s education, immunization, and breastfeeding all have a significant influence on the incidence of stunting in children in this group. The risk of stunting tends to be higher in girls, children of mothers with higher or secondary education, children who do not receive immunization, and children who do not receive breast milk. Therefore, efforts to reduce the incidence of stunting must consider these factors to improve children's well-being.

DISCUSSION

This study was conducted on mothers and children under 2 years old in Poso Regency. The results showed that the sex of child variable showed significant results in relation to the incidence of stunting. Boys have a higher risk of stunting than girls with an odds ratio (OR) of 2.3. This indicates that in the population groups observed, boys have a higher likelihood of being stunted compared to girls. Boys are more at risk of stunting than baby girls. Studies have shown that boys may be more vulnerable to undernutrition and subsequent stunting when faced with the increased energetic costs of illness or dietary inadequacy due to biological differences (22–26). Boys are more likely to be wasted, stunted, and underweight than girls, with variance by context (23,26). The underlying mechanisms for the biological difference are poorly understood, but it is suggested that boys may be in greater competition with their mothers than girls (23). The sex factor can be an important indicator in the identification and further understanding of stunting risk in children in this population, which can aid more appropriate program planning and intervention actions.

The mother’s education variable has strong significance associated with the incidence of stunting in children in this population. Children of mothers with primary and secondary education levels have a higher risk of stunting compared to children of mothers with higher education. With OR scores of 4.7 and 3.9 respectively, these results suggest that maternal education level significantly affects the risk of stunting in children. Therefore, attention to maternal education and efforts to increase understanding and knowledge of good nutrition practices are important in efforts to tackle stunting. Research studies have shown that the mother's low education level affects the risk of children under five experiencing stunting by 3.01 times compared to those with higher education levels (27). This is because mothers with low education tend to be less knowledgeable about nutritional intake before pregnancy, during pregnancy, and after delivery, which has an impact on children born with stunting compared to mothers with higher education (27).

Immunization variables also showed a very significant relationship with the incidence of stunting. Children who did not receive immunization had a much higher risk of stunting compared to those who received

immunization, with an odds ratio (OR) of 23.5. These results confirm the importance of immunization programs in reducing the risk of stunting, suggesting that unvaccinated children have a much higher risk of stunting. Several studies have found that the completeness of immunization is associated with stunting among children under five years old. For example, a study in Indonesia concluded that the completeness of immunization is associated with stunting among children under five years old (28). Similarly, a study in Nigeria found that vaccination uptake was negatively associated with stunting, indicating that children who received the recommended vaccinations were less likely to be stunted (29). Another study in Thailand also reported that children with incomplete vaccination coverage were more likely to be stunted (30). The timing of vaccination may be essential in determining the incidence of stunting in children. A study found that the timing of BCG vaccination within the first year of life might be important in determining the size and prevalence of stunting (31). The study also found that full and early coverage of vaccinations could substantially reduce stunting in low-income countries (31).

The results also showed that breastfeeding also has a significant relationship with the incidence of stunting in children under 2 years old. Research by Lestari et al (2018) shows that exclusive breastfeeding is a protective factor against the incidence of stunting in children under 5 years old (32). Babies who are breastfed exclusively from poorer households are 20% less likely to be stunted than those who are not exclusively breastfed. Meanwhile, babies who are exclusively breastfed from wealthier households are 50% less likely to be stunted than those who are not exclusively breastfed from poorer households (33), addition to improving the socioeconomic status of households, the promotion of exclusive breastfeeding and maternal assistance in providing exclusive breastfeeding must be socialized massively.

Given the significant impact of maternal education, child immunization, and breastfeeding on stunting, it is essential to implement targeted interventions. Health education programs that empower mothers with the knowledge and skills to provide adequate nutrition and ensure complete immunization for their children are critical. Moreover, policies that promote and facilitate exclusive breastfeeding should be prioritized, particularly in economically disadvantaged regions. A multi-faceted approach is required to address the stunting issue in Poso Regency. Healthcare professionals should focus on early identification of at-risk children, particularly boys, and provide tailored nutritional support. Policymakers should consider strengthening immunization coverage and integrating maternal education programs into existing health services. Community leaders can play a pivotal role in promoting breastfeeding and advocating for increased resources to support stunting prevention efforts.

CONCLUSION

This study identified several key factors associated with the incidence of stunting in Poso Regency, namely gender, maternal education, immunization, and breastfeeding practices. Boys were found to be at a higher risk of stunting compared to girls, underscoring the need for gender-sensitive approaches in stunting prevention. Maternal education emerged as a significant determinant, with children of less-educated mothers being more vulnerable to stunting. Immunization was also highlighted as a critical protective factor, with non-immunized children facing a substantially higher risk. Furthermore, exclusive breastfeeding was shown to offer considerable protection against stunting, particularly in economically disadvantaged households.

SUGGESTION

In light of these findings, efforts to reduce the incidence of stunting in this population should prioritize targeted interventions based on identified risk factors. Strategies could include gender-sensitive approaches, educational programs for mothers with lower educational levels, and enhanced promotion and accessibility of immunization and breastfeeding practices.

Additionally, a comprehensive public health campaign should be initiated to raise awareness about the significant impact of these factors on child stunting. Collaborative efforts between healthcare providers, policymakers, and community leaders are essential to implement effective interventions and improve the overall well-being of children in the studied region.

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