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The Relationship Between Immunization, Health Insurance, Family Support, and Health Workers with Stunting Incidence

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ABSTRACT

Stunting remains a critical public health concern in Indonesia, with the Banjar Regency—specifically the Aluh-Aluh Public Health Center working area—reporting a persistently high prevalence. Beyond direct nutritional factors, stunting is influenced by underlying determinants such as access to health services and the quality of household caregiving. This study aimed to analyze the associations between immunization status, health insurance ownership, family support, and health worker support with the incidence of stunting among children under five. Methods: A quantitative case-control study was conducted involving 144 children (72 stunted cases and 72 non-stunted controls). Participants were selected through a two-stage sampling process: purposive selection of high-risk villages followed by random selection of eligible children, matched by sex. Data were collected via structured questionnaires and secondary anthropometric data from the e-PPGBM system. Statistical analysis was performed using univariate and bivariate chi-square tests to determine odds ratios (OR) and 95% confidence intervals (CI). The findings indicated no significant associations between stunting and immunization status (p = 1.000), health insurance ownership (p = 0.717), or health worker support (p = 0.074). However, family support was significantly associated with stunting incidence (p = 0.040). Children receiving poor family support had 2.385 times higher odds of being stunted compared to those receiving good support (OR = 2.385; 95% CI = 1.026–5.545). While access to health services is an important framework, household-level caregiving practices—manifested through family support—play a decisive role in stunting prevention in this setting.

Key Messages:

- Strengthening family support systems can serve as a practical and community-based approach to reduce stunting among children under five, particularly in areas with limited access to health and nutrition services.
- Findings emphasize the need for integrated stunting prevention programs that go beyond biomedical factors and actively involve families in promoting optimal child growth and nutrition.

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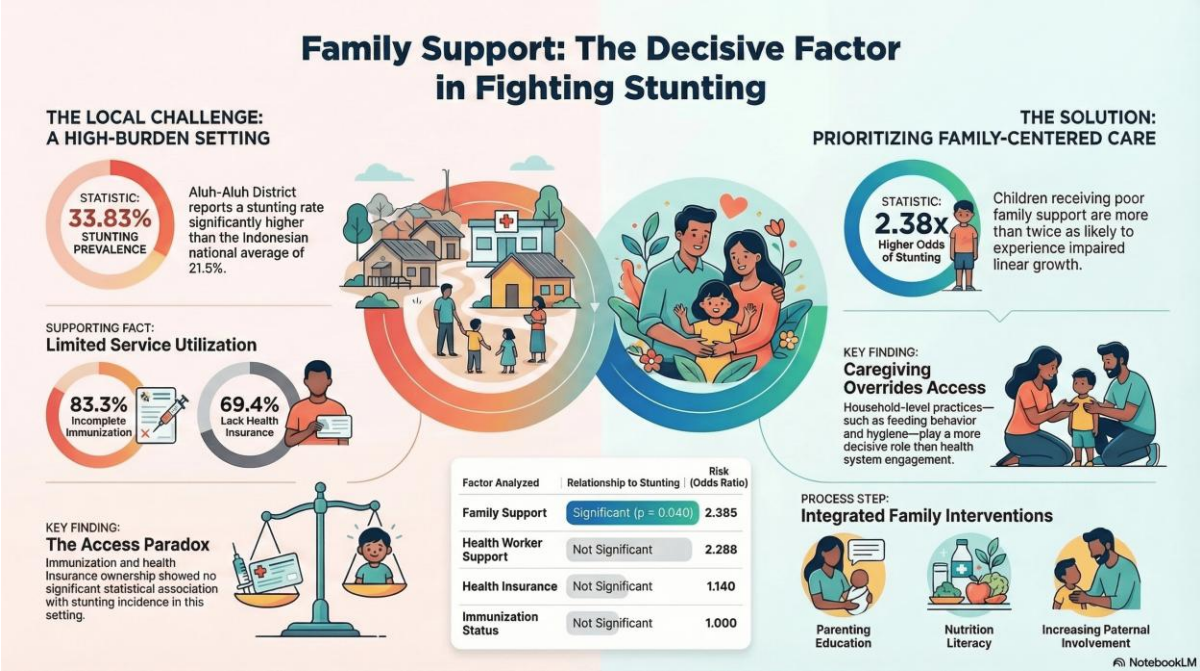
GRAPHICAL ABSTRACT



INTRODUCTION

Stunting is a major public health problem characterized by chronic growth failure resulting from prolonged undernutrition and recurrent infections, leading to adverse consequences for cognitive development, productivity, and long-term health (1). Globally, 22.3% of children under five were stunted in 2022, with Asia accounting for 52% of cases (2). In Indonesia, the prevalence of stunting remains high at 21.5%, with South Kalimantan Province and Banjar Regency reporting even higher rates of 24.7% and 30.1%, respectively (3). Within Banjar Regency, Aluh-Aluh District recorded one of the highest stunting prevalences at 33.83% in 2024, indicating a persistent local burden that requires focused public health attention and context-specific evidence to guide effective interventions (4).

According to the UNICEF and IFPRI conceptual frameworks, stunting arises from a complex interaction between direct causes—namely inadequate dietary intake and infectious diseases—and underlying determinants related to household conditions, caregiving practices, and the health system environment (5,6). These frameworks emphasize that access to health services and the quality of caregiving are critical pathways influencing child nutritional status. Preventive services such as immunization contribute to reducing infection-related growth impairment, while health insurance facilitates access to essential maternal and child health services, including growth monitoring and nutrition counseling. In parallel, family support and health worker support shape daily caregiving behaviors, health-seeking practices, and adherence to recommended child-feeding and hygiene practices, which are central to sustained child growth.

In resource-limited and geographically constrained settings, such as coastal areas, the effectiveness of health interventions may be moderated by socioeconomic vulnerability, cultural caregiving patterns, and service accessibility. Family support plays a pivotal role in translating health knowledge into practice, as families determine food allocation, caregiving routines, and utilization of available health services. Similarly, health worker support influences caregivers' knowledge, motivation, and continuity of growth monitoring; however, its impact depends on the family's capacity and willingness to implement recommendations at the household level. Thus, immunization status, health insurance ownership, family support, and health worker support represent interconnected determinants operating across individual, household, and health system levels within the stunting framework.

Previous studies have identified inadequate nutrient intake, household economic status, parental education, and environmental conditions as important determinants of stunting (7). Nevertheless,

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evidence regarding the combined role of immunization status, health insurance ownership, family support, and health worker support remains limited and highly context-dependent. In Aluh-Aluh District, local surveillance data indicate low immunization coverage, limited health insurance ownership, and suboptimal growth monitoring, suggesting potential gaps between service availability and effective utilization (4). Understanding how these factors interact and which determinants are most strongly associated with stunting is essential for prioritizing interventions in this high-burden setting.

Therefore, this study aims to analyze the relationships among immunization status, health insurance ownership, family support, and health worker support and the incidence of stunting among children under five in the working area of the Aluh-Aluh Public Health Center, Banjar Regency.

METHODS

This This study used a quantitative case–control design conducted in May 2025 in the working area of the Aluh-Aluh Public Health Center, Banjar Regency, South Kalimantan Province. The study population comprised all children under five years of age in the area (N = 1,973). A total of 144 children were included, consisting of 72 stunted children (cases) and 72 non-stunted children (controls), with a 1:1 ratio. Sample size was calculated using the Lemeshow formula for two proportions in case–control studies with a 95% confidence level, 80% power, and reference exposure proportions from previous studies; after adjustment for a finite population, the minimum required sample size was 72 participants per group. Sampling was conducted using a two-stage purposive cluster random sampling technique. In the first stage, three villages and five posyandu were purposively selected based on high stunting prevalence, poor sanitation conditions, limited access to safe drinking water, and geographic accessibility. In the second stage, eligible children were randomly selected from posyandu registration lists, with matching performed by sex to reduce selection bias.

Stunting status was determined using length-for-age or height-for-age Z-scores based on the WHO Child Growth Standards 2006, with a cut-off value of < –2 SD. Anthropometric measurements were obtained using infantometers for children under two years and microtoise for older children, measured by trained health workers or posyandu cadres during routine posyandu activities. Immunization status was classified as complete or incomplete based on receipt of basic immunizations (BCG, DPT-HB-Hib, Polio, and Measles), verified using the child health card (KIA/KMS) and supported by maternal recall. Health insurance ownership was defined as having any form of insurance, including BPJS Health, regional health insurance, or other schemes, and categorized as yes or no.

Family support and health worker support were measured using self-developed questionnaires consisting of 10 items each, assessed on a 5-point Likert scale. Total scores ranged from 10 to 50, with a cut-off score of 37.5 used to categorize support as good or poor. Content validity was assessed through expert judgment, and reliability testing demonstrated acceptable internal consistency. Primary data were collected through structured interviews with parents or caregivers, while secondary anthropometric data were obtained from the e-PPGBM system. To minimize recall bias, immunization information was cross-checked using the KIA/KMS. Data were analyzed using univariate frequency distributions and bivariate chi-square tests to assess associations between study variables and stunting incidence, with odds ratios and 95% confidence intervals reported. Multivariate logistic regression analysis was not performed because only one independent variable showed a statistically significant association in bivariate analysis. Ethical approval was obtained from the Health Research Ethics Committee of Lambung Mangkurat University (Approval Number: 026/KEPK-FKIK ULM/EC/V/2025).

CODE OF HEALTH ETHICS

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RESULTS

Most children under five included in this study had incomplete immunization status (83.3%) and did not have health insurance (69.4%). Nevertheless, the majority of respondents reported receiving good

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family support (79.2%) and good health worker support (83.3%) in childcare and stunting prevention efforts. The proportion of stunted and non-stunted children was equal, with each group comprising 50% of the total sample (Table 1).

Table 1. Characteristics of Respondents

Characteristics	n	%
Immunization		
Complete	24	16.7
Incomplete	120	83.3
Ownership of Health Insurance		
Has Insurance	44	30.6
No Insurance	100	69.4
Family Support		
Good	114	79.2
Poor	30	20.8
Health Worker Support		
Good	120	83.3
Poor	24	16.7
Stunting Incidence		
Not Stunted	72	50.0
Stunted	72	50.0
Total	144	100.0

The bivariate analysis showed no statistically significant association between immunization status and stunting incidence (p = 0.999). The identical proportion of complete and incomplete immunization status between stunted and non-stunted groups indicates that immunization coverage did not differ between the two groups in this study population. Similarly, ownership of health insurance was not significantly associated with stunting (p = 0.717), suggesting that access to financial protection for health services alone was insufficient to differentiate stunting status among children under five.

Table 2. Relationship of Each Variable with Stunting Incidence

Variables	Stunting Incidence				p-value	Odds Ratio	95% CI
	Not Stunted		Stunted				
	n	%	n	%			
Immunization							
Complete	12	16,7%	12	16,7%	0,999	1,000	0,416–2,403
Incomplete	60	83,3%	60	83,3%			
Ownership of Health Insurance							
Has Insurance	23	31,9%	21	29,2%	0,717	1,140	0,561–2,318
No Insurance	49	68,1%	51	70,8%			
Family Support							
Good	62	86,1%	52	72,2%	0,040	2,385	1,026–5,545
Poor	10	13,9%	20	27,8%			
Health Worker Support							
Good	64	88,9%	56	77,8%	0,074	2,286	0,910–5,743
Poor	8	11,1%	16	22,2%			
Total	**72**	**100%**	**72**	**100%**			

Family support was the only variable that showed a statistically significant association with stunting incidence (p = 0.040). Children who received poor family support had 2.38 times higher odds of being stunted compared to those who received good family support (OR = 2.385; 95% CI: 1.026–5.545). This finding indicates that inadequate family involvement in child feeding practices, growth monitoring, hygiene behavior, and utilization of health services substantially increases the risk of stunting.

Health worker support showed a relatively strong odds ratio (OR = 2.286; 95% CI: 0.910–5.743), indicating a potential increased risk of stunting among children receiving poor health worker support. However, this association did not reach statistical significance (p = 0.074). This result suggests a possible trend that may become significant in a larger sample or after adjustment for other covariates. Because the analysis was limited to bivariate testing, the independent effect of family support after controlling for other

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determinants could not be fully assessed. Multivariate logistic regression analysis was initially considered; however, it was not conducted because only one independent variable demonstrated a statistically significant association in bivariate analysis. Therefore, the findings of this study should be interpreted with caution, particularly regarding potential confounding effects between variables.

DISCUSSION

This study demonstrates that stunting among children under five in Aluh-Aluh District is a multifactorial problem influenced by household, service-related, and socioeconomic factors. Although most children received good family and health worker support, stunting prevalence remained high. Among the variables examined, only family support showed a statistically significant association with stunting incidence, while immunization status, health insurance ownership, and health worker support were not significantly related to child growth outcomes. These findings indicate that daily caregiving practices within the household may play a more decisive role in preventing stunting than access-related factors alone in this coastal setting.

Regarding health insurance ownership, this study found no significant difference between stunted and non-stunted children, with most children in both groups lacking insurance coverage. This finding contrasts with studies conducted in Uganda and Sub-Saharan Africa, which reported that participation in health insurance programs reduced the risk of stunting through improved access to antenatal care, infection treatment, and nutrition-related services (12,13). Similar protective effects of health insurance were also reported in Rwanda and Indonesia, where insured households demonstrated better utilization of health and nutrition services for children (14,15). In the context of Aluh-Aluh, the absence of such an association may be explained by geographic isolation, limited transportation, and reliance on informal or community-based healthcare, which reduce the practical benefits of insurance ownership.

Immunization status was also not significantly associated with stunting incidence, despite the high proportion of children with incomplete basic immunization. This suggests that low immunization coverage was a shared condition across both stunted and non-stunted groups, thereby limiting its discriminatory effect on growth outcomes. While immunization is essential for preventing infection-related morbidity, its role in preventing chronic linear growth failure may be diminished when children continue to experience inadequate dietary intake, recurrent non-vaccine-preventable infections, and suboptimal environmental conditions.

Family support emerged as the only variable significantly associated with stunting in this study. Children who received poor family support had 2.4 times higher odds of being stunted compared to those who received good support. This finding underscores the critical role of family involvement in daily caregiving practices, including feeding behavior, hygiene, growth monitoring, and health-seeking actions. Previous studies have demonstrated that strong family and social support improve maternal caregiving practices and reduce the risk of stunting (16,17). Other research has also highlighted the importance of parenting patterns, family income, and maternal knowledge as key determinants of child growth outcomes (18,19). Furthermore, parental education and family empowerment programs have been shown to enhance caregivers' ability to apply appropriate child-feeding and health practices (20). These findings collectively support the notion that family support represents a central pathway through which stunting prevention efforts can be sustained (21,22).

Health worker support, although relatively high among respondents, was not significantly associated with stunting incidence in this study. This finding suggests that the effectiveness of health worker interventions depends largely on the family's capacity to implement recommendations in daily life. Previous studies have emphasized that health workers play an important role in strengthening family commitment and providing nutrition and hygiene education; however, their impact is limited when socioeconomic barriers and weak family engagement persist (23,24). Evidence from community-based studies indicates that empowering health cadres and improving parental education can enhance growth monitoring and child-feeding practices, but sustained outcomes require active household participation (25,26). Other studies have similarly shown that family-based strategies, including paternal involvement and household food security, are more effective when integrated with health worker support (27,28).

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Several limitations of this study should be acknowledged. The case–control design and cross-sectional data collection limit causal inference. Information bias may have occurred due to reliance on self-reported data, particularly for family and health worker support variables. In addition, important confounding factors—such as household income, dietary intake, maternal nutritional status, and sanitation conditions—were not included in the analysis. The purposive selection of villages may also limit the generalizability of findings to other settings.

Despite these limitations, this study provides important implications for stunting prevention programs. The findings indicate that improving access to services—such as immunization, health insurance, and health worker support—must be accompanied by strengthened family capacity for daily caregiving. Stunting prevention strategies in Aluh-Aluh should prioritize family-centered interventions, including parenting education, nutrition literacy improvement, and increased father involvement, while continuing to support community-based health services. Integrating family empowerment with existing health and social programs is essential to ensure that health education translates into sustained behavioral change and meaningful reductions in stunting.

CONCLUSION

This study demonstrates that stunting among children under five in the Aluh-Aluh Health Center working area is a multifactorial condition. Among the variables examined, family support was the only factor significantly associated with stunting, indicating that inadequate caregiving substantially increases the risk of impaired linear growth. This finding underscores the central role of household-level practices in stunting prevention.

Although immunization status, health insurance ownership, and health worker support were not significantly associated with stunting, the high prevalence of incomplete immunization remains a critical public health concern and should continue to be addressed. The lack of association between access-related factors and stunting suggests that service availability alone may be insufficient without effective utilization and strong family engagement.

Stunting prevention strategies should therefore adopt an integrated approach that prioritizes family-centered interventions while strengthening existing health services. Practical actions include incorporating structured family care education into routine posyandu activities, focusing on age-appropriate caregiving, use of locally available nutritious foods, child development stimulation, and continuous monitoring supported by community health workers. Further studies using mixed-methods designs are recommended to better understand contextual pathways through which family support influences child growth outcomes.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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