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Risk Factors for Stunting in Children Aged 2-3 Years in Sukamakmur District, Aceh Besar Regency

Yuseriana Agustina[1]*, Nasrul Z[2], Said Usman[3], Marthoenis[4], T.Maulana[5]
Universitas Syiah Kuala, Banda Aceh, Indonesia[1,2,3,4,5]
Email: dedek.yuseriana18@gmail.com

KEYWORDS
Stunting Incidence, Maternal Factors, Child Factors, Environmental Factors

ABSTRACT
Stunting can cause serious impacts including impaired physical and cognitive growth and development, decreased body resistance to infection, and the risk of long-term health problems. The prevalence of stunting among children under five in 2023 in Aceh was recorded at 27.9%, and in Aceh District it was 25.8%. This research aims to determine the risk factors for stunting in children aged 2-3 years in Sukamakmur District, Aceh Besar Regency. Research Observational research with a cross-sectional design. The population includes all stunted toddlers in Sukamakmur District totaling 131 people. The statistical analysis used is Partial Least Square with smartPLS 3.0. Results: There was a relationship between maternal factors (t=5,259; p=0.000), child factors (t=2,556; p=0.000), and environmental factors with the incidence of stunting in children aged 2-3 in Sukamakmur District, Aceh Besar Regency (t= 3,594; p=0.000). Furthermore, there was a relationship between maternal factors (t=4.155; p= 0.000) and environmental factors with child factors on the incidence of stunting in toddlers aged 2-3 years (t=3.397; p= 0.001). Conclusion: Maternal factors are a very significant factor in the incidence of stunting in children aged 2-3 years in Sukamakmur District, Aceh Besar Regency. Furthermore, child and environmental factors also influence the incidence of stunting in children aged 2-3 years in Sukamakmur District, Aceh Besar Regency.

DOI:

Corresponding Author: Yuseriana Agustina *
Email: dedek.yuseriana18@gmail.com

INTRODUCTION

Stunting is a condition of failure to grow in toddlers due to chronic malnutrition for a long time. This condition can have adverse effects, such as impaired physical and brain growth, low intelligence, susceptibility to disease, and decreased productivity later in life (Karpinski, Kinase Kolb, Tetreault, & Borowski, 2018). Globally, the prevalence of stunting reaches 22.2% or 150.8 million children under five. In Asia, this figure is even higher, at 33.3%. Meanwhile, Indonesia has a stunting prevalence of 24.4% or 1 in 4 children under five. Aceh itself ranks third highest nationally with a prevalence of 33.2%. Risk factors for stunting include mothers, children, and the environment. Maternal factors include low education, young age during pregnancy, tight pregnancy spacing, and poor nutritional status (Gonete, Kassahun, Mekonnen, & Takele, 2021). Meanwhile, child factors include low birth weight, not getting exclusive breast milk, and a history of infectious diseases. Environments with poor access to clean water and sanitation, as well as low food security also contribute to stunting (Kwami, Godfrey, Gavilan, Lakhanpaul, & Parikh, 2019).

Efforts to prevent stunting can be carried out through exclusive breastfeeding, providing nutritious complementary foods, maintaining maternal and child health, increasing access to clean water

and sanitation, and increasing food security. In Aceh, 12 districts/cities have a stunting prevalence above the provincial average, with Gayo Lues Regency as the area with the highest rate (42.9%), while Banda Aceh City has the lowest prevalence (23.4%). Intervention at the age of 2-3 years is very important to maximize children's potential and prevent stunting, considering the rapid physical and brain growth of children in this age range (Hargreaves et al., 2022). Stunting is a serious health problem that must be overcome through comprehensive efforts and involving various parties. Intervention at the age of 2-3 years is very crucial to prevent the adverse effects of stunting and maximize the child's potential in the future (Saleh, Syahrul, Hadju, Andriani, & Restika, 2021).

This section lacks a comprehensive review of relevant previous research and does not explicitly discuss the novelty or contribution of this research compared to previous studies.

Stunting, defined as the failure of toddlers to grow due to chronic malnutrition, has significant implications such as impaired physical and brain growth, reduced intelligence, susceptibility to diseases, and diminished productivity in later life. Globally, stunting affects 22.2% or approximately 150.8 million children under five, with even higher rates in Asia at 33.3%. In Indonesia, 24.4% of children under five are stunted, with Aceh having the third-highest prevalence nationally at 33.2%. Risk factors encompass maternal factors like low education and poor nutrition, child factors such as low birth weight and lack of exclusive breastfeeding, and environmental issues including inadequate sanitation and food insecurity.

Efforts to combat stunting include promoting exclusive breastfeeding, providing nutritious complementary foods, improving maternal and child healthcare, ensuring access to clean water and sanitation, and enhancing food security. In Aceh, 12 districts/cities exceed the provincial stunting average, with Gayo Lues Regency reporting the highest prevalence at 42.9% and Banda Aceh City the lowest at 23.4%. Early intervention at ages 2-3 is critical to optimize children's potential and prevent stunting, given the rapid physical and brain development during this period. Addressing stunting demands comprehensive, collaborative efforts involving multiple stakeholders.

However, this section does not delve deeply into pertinent prior research nor explicitly delineate the unique contributions of this study compared to existing literature.

METHODS

This research is Quantitative Research by using the design correlational, with a cross-sectional study. The population in this study is all stunted toddlers aged 2-3 years in Sukamakmur District, which is 131 toddlers. Sampling using the total population technique. Data analysis was carried out univariate and multivariate using SmartPLS.

RESULTS and DISCUSSION

Characteristics of Respondents

The characteristics of the observed respondents include age, gender and education in full in Table 1 below:

Table 1.
Characteristics of Respondents Based on Age and Gender of Toddlers

Characteristic	Category	Sum	
		f	%
Toddler Age	24-28 Months	66	50,38
	29-33 Months	32	24,43
	34-36 Months	33	25,19
Gender	Man	82	62,6
	Woman	49	37,4

Source: Data Processed (2024)

Based on table 1, the characteristics of the respondents showed that most of the toddlers were in the age range of 24-28 months, which was 66 people or 50.38%. Meanwhile, toddlers aged 29-33

months and 34-36 months amounted to 32 people (24.43%) and 33 people (25.19%), respectively. In terms of gender, the number of male toddlers is more than that of female toddlers, with a proportion of 62.6% for males and 37.4% for females.

Model Measurement (Outer Model)

Measurement (Outer Model) refers to the stage of analysis related to the constructs and observational variables used in the model (Hair, Howard, & Nitzl, 2020). This stage is often known as the "Outer Model" because of its focus on measuring and validating observational variables that are part of a larger construct.

Table 3.
Composite Reliability, Cronbach Alpha and Average Variance Extracted

Variable	*Cronbach Alpha*	*Composite Reliability*	*Average Variance Extracted*
Child Factor (Latin Variable 1)	0,846	0,897	0,687
Mother Factor (Latin variable 2)	0,782	0,861	0,608
Environmental Factors (Latin Variable 4)	0,873	0,901	0,570
Stunting Incidence (Latin variable 3)	0,930	0,905	0,827

Source: Data Processed (2024)

Based on 3, it can be concluded that all constructs meet the reliable criteria, this is indicated by the composite reliability value > 0.70; Cronbach alpha >0.6 and AVE > 0.50 as recommended by Fornell and Lacker in (Sujiati, Nasrul, Usman, Saputra, & Muhazar, 2022).

R-Square, F-Square, and Fitness Model

The full R Square, F Square and Fitness Model test results are as follows:

Table 4.
R-Square, F-Square and Fitness Model Values

It	Variable	R-Squares	f-Square	Saturated Model	Estimate Model
1	Child Factor (Latin Variable 1)	0,471	-	-	-
2	Stunting Incidence (Latin Variable 3)	0,785	0,429	-	-
3	The Mother Factor on Child Factors and the Incidence of Stunting	-	0,429	-	-
4	Environmental Factors on Child Factors and the Incidence of Stunting	-	0,294	-	-
5	SRMR	-	-	0,033	0,037

Source: Data Processed (2024)

The R-squared value shows the ability of the latent variable to explain the variance of the dependent variable. In the table, the Child Factor (Latin Variable 1) has an R-Square value of 0.471, which means that 47.1% of the variance of the Child Factor can be explained by other variables in the model. Meanwhile, the Stunting Incidence (Latin Variable 3) has a higher R-Square value, which is 0.785, which means that 78.5% of the Stunting Incidence variance can be explained by the variables in the model. The f-squared value shows the effect of measuring the influence of one latent variable on other latent variables. From the table, it can be seen that the Child Factor has an effect of 0.389 on the incidence of stunting. The Mother Factor has an effect of 0.429 on the Child Factor and 0.441 on the Stunting Incident. Meanwhile, Environmental Factors had an effect of 0.294 on Child Factors and 0.264 on Stunting Events. For the matching model, the SRMR (Standardized Root Mean Square Residual) value indicates the level of the match of the model (Ximénez, Maydeu-Olivares, Shi, & Revuelta, 2022). The smaller the SRMR value, the better the model. In the table, the saturation model has an SRMR

value of 0.033, while the estimation model has an SRMR value of 0.037, which means the estimation model also has a good match rate.

Based on the data presented in Table 4, the child factor variable (Latent Variable 1) has an R-squared value of 0.471. This shows that 47.1% of the variance in the Child Factor variable can be explained by other variables in the model. The Stunting Incidence Variable (Latent Variable 3) has an R-Square value of 0.785. This figure indicates that 78.5% of the variance in the Stunting Incidence variable can be explained by other variables in the model.

Structural Model (Inner Model)

Table 5.
Inner Model Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic (|O/STDEV|)	P Value
Child Factors →in the Inci Stunting	0,190	0,192	0,075	2,517	0,012
Mother Factor →Child Factor	0,396	0,397	0,095	4,141	0,000
Maternal Factors → for Stunting Incidence	0,495	0,495	0,095	5,070	0,000
Environmental Factors → Child Factors	0,337	0,34	0,103	3,272	0,001
Environmental Factors → for Stunting Incidence	0,298	0,295	0,084	3,553	0,000

Source: Data Processed (2024)

Table 5 shows the results of testing the effects of child factors, maternal factors, and environmental factors on the incidence of stunting in toddlers in full. First, the effect of child factors on stunting incidence has a value (t=2.517; p=0.012) which means that there is a significant relationship between child factors and stunting incidence. Second, the effect of the maternal factor on the child factor showed a value (t=4141; p=0.000) which means that there was a significant relationship between the maternal factor and the child factor. Third, the effect of maternal factors on stunting incidence has (t=5.070; p=0.000), meaning that there is a significant relationship between maternal factors and stunting incidence. Fourth, the effect of environmental factors on child factors shows (t=3.772; p=0.001) meaning that there is a significant relationship between environmental factors and child factors. Finally, the effect of environmental factors on the incidence of stunting has (t=3.553; p=0.000) which shows a significant relationship between environmental factors and the incidence of stunting in toddlers. Thus, the results of the analysis concluded that child factors, maternal factors, and environmental factors had a significant influence on the incidence of stunting in toddlers (Utami, Setiawan, & Fitriyani, 2019).

The results of the analysis showed that the child factor had a significant influence on the incidence of stunting in toddlers. A t-statistical value of 2.517 with a p-value of 0.012 indicates a significant relationship between child factors and stunting incidence. This indicates that the characteristics and conditions of children, such as nutritional history and infectious diseases, play an important role in determining the stunting status of toddlers (Fadjriah, Rusdianto, Herman, & Vidyanto, 2021).

Furthermore, further analysis shows that the maternal factor has a significant influence on the child factor. A t-statistical value of 4.141 with a p-value of 0.000 indicates a strong relationship between the maternal factor and the child factor. These findings confirm the important role of maternal conditions and behaviours, such as nutritional status, knowledge, and parenting practices, in influencing children's health conditions and growth (Sleddens et al., 2014). Furthermore, the results of the study also show that the maternal factor has a significant influence on the incidence of stunting in toddlers. A t-statistical value of 5.070 with a p-value of 0.000 indicates a strong relationship between maternal factors and stunting incidence. In addition, the results of the analysis also revealed that environmental

factors have a significant influence on child factors. A t-statistical value of 3.772 with a p-value of 0.001 indicates a strong relationship between environmental factors and child factors. These findings emphasize the importance of considering environmental aspects, such as sanitation, access to clean water, and hygiene, in influencing children's health and growth (Moffa et al., 2019). Finally, the results of the study also show that environmental factors have a significant influence on the incidence of stunting in toddlers. A t-statistical value of 3.553 with a p-value of 0.000 indicates a strong relationship between environmental factors and stunting incidence. This emphasizes the need to pay attention to environmental conditions that can contribute to stunting problems, such as poor sanitation and limited access to clean water sources (Tasic et al., 2020).

A study conducted by Ramli, & Putri, T. (n.d.) shows that maternal factors, such as nutritional status, education level, and feeding practices, play an important role in determining the growth status of children. The results of this study are in line with the findings in the current study, which emphasizes the importance of considering mother-related factors in preventing and overcoming stunting problems (Phyo, Khin, & Aung, 2021).

CONCLUSION

Maternal Factors, Child Factors, and Environmental Factors are significantly related to the incidence of stunting in children aged 2-3 years in Sukamakmur District, Aceh Besar Regency. The Mother Factor has the strongest influence on the Stunting Incidence, followed by the Child Factor and Environmental Factors. In addition, the Mother Factor also has a significant relationship with the Child Factor, and the Environmental Factor has a significant relationship with the Child Factor. Furthermore, the Mother Factor also has a significant relationship with Environmental Factors in relation to the Incidence of Stunting in children aged 2-3 years.

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