Volume 10, Issue 06, June 2024,
Publish Date: 16-06-2024
Doi https://doi.org/10.55640/ijmsdh-10-06-04

International Journal of Medical Science and Dental Health (Open Access)

THE RELATIONSHIP OF LOW BIRTH WEIGHT WITH STUNTING INCIDENTS IN ACEH IN 2022

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ABSTRACT

Background: Stunting is a failure in growth and development experienced by children due to insufficient nutritional intake, infectious diseases over a long period of time which is characterized by length or height that is not appropriate for their age. Stunting is still a major health problem in Aceh Province because its prevalence is still high and is ranked 5th nationally. Objective: to determine the determinants of stunting in toddlers in Aceh Province. Research method: Descriptive quantitative research with a cross sectional design with a sample size of 16865 toddlers obtained from total sampling based on inclusion and exclusion criteria. The data used is 2022 SSGI data belonging to the Ministry of Health's BKPK. The independent variables in this study include Early Breastfeeding Initiation (IMD), completeness of immunization, ISPA, diarrhea, ownership of health insurance, ownership of KIA books, drinking water facilities, ownership of toilets, mother's education, gender of toddler, birth weight, number of families, and regional classification. Data analysis includes univariate and bivariate using chii square and multivariate using multiple logistic regression. Results: The prevalence of stunting in children aged 0 – 59 months is 31.7% in Aceh Province in 2022. Bivariate results are low birth weight (p=0.033). Conclusion: the high prevalence of stunting in Aceh Province in 2022 is caused by multiple and interrelated factors, both specific and sensitive. To reduce the stunting rate, preventive and promotive measures need to be taken early on.by carrying out routine check-ups during pregnancy and consuming a variety of foods. Short birth length babies need to receive growth and development monitoring, additional food and nutrition and health Information Communication and Education (KIE) interventions for mothers of toddlers.

Keywords: Low birth weight, stunting.

INTRODUCTION

Stuntingis a condition where a toddler has less length or height compared to age. This condition is measured by body length or height that is more than minus two standard deviations from the median of WHO child growth standards *(Ministry of Health, 2014)*. Stunted toddlers are a chronic nutritional

problem caused by many factors such as socio-economic conditions, maternal nutrition during pregnancy, pain in babies, and lack of nutritional intake in babies. Stunted toddlers in the future will experience difficulties in achieving optimal physical and cognitive development *(Prendergast & Humphrey, 2014).*

The impact of stunting on children reduces cognitive, motor and verbal development in children which is not optimal. Brain disorders in children are associated with poor performance on cognitive tests, including deficits in literacy, numeracy, reasoning and vocabulary *(Oot et al., 2016)*. Research in South Africa found that the average scores for stunted children for three areas of performance, namely mathematics, reading and writing, were worse than children of normal height. *(Pienaar, 2019)*. Children who experience stunting have lower academic scores than those who do not experience stunting *(Seyoum et al., 2019).*

Increases and decreases in the percentage of stunted toddlers also occurred in Aceh. The prevalence of stunting in Aceh province in 2007 was 44.6% and there was a decline in 2010 where the prevalence of stunting became 39%. In 2013, the prevalence of stunting increased again from the previous year, namely 41.5% and decreased in 2018 to 37.7% *(Balitbangkes, 2018)*. Based on the results of the Indonesian Toddler Nutritional Status Study (SSGBI), the prevalence of stunting in Aceh Province in 2019 was 34.18%. Aceh Province has high cases of stunting based on the cut off point for stunting determined by WHO *(Statistics & Health, 2019)*.

There has been little change in the prevalence of stunting in Indonesia over the last decade. There are large disparities subnationally ranging from 26% in the Riau Islands to 52% in East Nusa Tenggara. This highlights variations in population exposure to the determinants of child stunting and the need to target and tailor interventions to the most vulnerable. There are many potential causes of stunting in Indonesia, including determining factors such as maternal nutritional status, breastfeeding practices, complementary feeding practices, and exposure to infections as well as other determining factors such as education, food systems, health care, water and sanitation *(Beal et al., 2018).*

Around 6 million children are reported to experience stunting and wasting simultaneously. There are many factors that contribute to malnutrition in childhood. Common determinants reported by several studies include socioeconomic, geographic differences, suboptimal feeding practices, household food insecurity, maternal knowledge and childhood morbidity *(Khan et al., 2019)*.

Some sub-Saharan countries have experienced a reduction in stunting, other countries have not succeeded in combating stunting and in these countries chronic malnutrition is widespread with a prevalence of more than 40%. The Republic of Congo is one of the countries with the highest prevalence of stunting in the region. A number of factors can cause linear growth failure, such as infectious diseases and suboptimal feeding practices. Additionally, various environmental conditions can influence linear growth during the first years of life, including maternal nutritional status, access to safe drinking water, hygiene and sanitation. There is a growing understanding of the relationship between stunting and socio-economic factors *(Kismul et al., 2017)*.

According to WHO, there are 2 causes of stunting in toddlers, namely direct and indirect causes. The direct causes of stunting are household and family factors, inadequate complementary feeding,

breastfeeding and infectious diseases. Meanwhile, indirect causes of stunting are food availability, access to facilities, environmental and cultural factors (WHO, 2014). There are other factors that influence stunting such as immunization, administration of vitamin A, early initiation of breastfeeding (IMD), delivery assistance, and use of health insurance.

The first thousand days of life (1000 HPK) greatly determine a child's nutritional status, one of which is stunting. Stunting prevention carried out in Indonesia currently also takes the form of specific nutrition and sensitive nutrition. Specific nutritional interventions start from pregnancy to toddlerhood, including adequate food and nutrition, feeding, care and parenting, as well as treatment of infections/diseases. Meanwhile, sensitive nutrition interventions include increasing access to nutritional food, increasing awareness, commitment and practice of nutritional care for mothers and children, increasing access and quality of nutrition and health services, as well as increasing the provision of clean water and sanitation facilities *(Satriawan, 2018)*.

The coverage of specific nutritional interventions in Aceh is still low. Coverage of IMD is 59.29% and only 37.38% receive exclusive breastfeeding. Only 41% of toddlers aged 6-23 months get a variety of foods. This shows that toddlers do not receive enough nutrition in the first 2 years of life. As many as 73.2% of toddlers received the PMT program, however there were 32.51% of toddlers who did not finish the PMT with the reason that most children did not want it and were eaten by other ART (Ministry of Health of the Republic of Indonesia, 2018). Treatment or prevention of disease/infection, one of which can be done with complete basic immunization, is also still low. Only 51% of toddlers receive complete basic immunization *(Aceh Health Office, 2019).*

UNICEF/World Health Organization (WHO)/World Bank Group stated that the percentage of stunted toddlers in the world has decreased slowly from 32.6% in 2000 to 22.2% in 2017. As many as 55% of stunted toddlers in the world come from Asia and 39 % of Africa. The highest proportion of stunting in Asia is South Asia (58.7%) and the lowest proportion is in Central Asia (0.9%) *(Fanzo et al., 2019).*

According to WHO, the prevalence of stunted toddlers in Indonesia is the third highest in the Southeast Asia Regional (SEAR). The average prevalence of stunted toddlers in Indonesia in 2015-2017 was 36.4% (Nuning, 2018). Based on Riskesdas data, the percentage of stunting in Indonesia has increased and decreased. The prevalence of stunting in 2007 was 36.8% higher than the prevalence of stunting in 2010, namely 35.6%. In 2013, the national prevalence of stunted toddlers and very stunted toddlers (stunting) again increased to 37.2% and decreased in 2018 to 30.8% *(Balitbangkes, 2018).*

Stuntinghas hit almost all countries, both developing and developed countries. In 2017, more than half of the world's stunted children came from Asia (55%), while more than a third (39%) lived in Africa. A total of 83.6 million children under five are stunted in Asia, the largest proportion coming from South Asia (58.7%) and the lowest proportion in Central Asia (0.9%). Indonesia is included in the third country with the highest prevalence in the Southeast Asia Region *(Balitbangkes, 2018).*

The decline in stunting prevalence in Aceh is very small, even smaller than the decline in stunting in NTT, which is only 1.0% compared to NTT Province, the decline in stunting reached 6%, as well as several other provinces which previously ranked 2nd in the 2019 SSGI. The 4 highest, namely West

Sulawesi (6.6%), West Nusa Tenggara (6.5%) and Gorontalo (5.0%) experienced a significant decline of between 5-6% *(RI Ministry of Health, 2021).*

Stuntingin toddlers is caused by multifactors which include age, gender, birth weight, mother's education level, nutritional status, mother's height, ante natal care (ANC) examination, place of residence, economic status, source of drinking water, and having a toilet. *(Amare et al., 2019).* Infectious diseases such as diarrhea, Upper Respiratory Tract Infections (ARI), and recurring pneumonia also contribute to stunting *(Himawati & Fitria Laila, 2020)*. Other factors such as exclusive breastfeeding, age of complementary foods, adequate levels of zinc and iron are also related to the incidence of stunting *(Aridiyah et al., 2015)*. Apart from getting good and appropriate MP ASI, children under five must also get a variety of MP ASI. The diversity in question is the diversity in the amount and type of food consumed by toddlers. The diversity of MP-ASI consumption is the dominant factor in the incidence of stunting *(Irmawati & Kusharisupeni Djokosujono, 2021)*.

Research in Surabaya shows that vitamin A supplementation is associated with stunting *(Putri et al., 2021).* Providing vitamin, A capsules from the government program can support efforts to reduce the incidence of stunting *(Fatimah & Chondro, 2020)*. Apart from vitamin A supplementation, complete immunization for toddlers also contributes to the incidence of stunting. Toddlers with incomplete immunization are at risk of stunting 7,320 times *(Sandra et al., 2021)*. The number of family members has a risk of stunting in children. Families that have many children, especially those with poor economic conditions, will not be able to provide adequate attention and food to all their children, especially children who are undergoing rapid growth, such as those aged 1-2 years. Growth and development disorders tend to be experienced by children born later because the burden borne by parents becomes greater with the increasing number of children they have. *(Candra, 2013)*.

Research in the city of Semarang shows that family conditions are related to stunting. Poor families can be assessed using several indicators such as the family's ability to have clothing, food, shelter, affordable access to education and health and asset ownership *(Mutiara et al., 2018)*. Low family income can be associated with food insecurity. Food insecurity is a condition of an area, community or household where the level of food availability and safety is not sufficient to meet the physiological needs standards for growth and health of some communities. So that families who lack income are unable to provide sufficient food, both in quantity and quality, that is safe, nutritious, equitable and affordable and that does not conflict with religion, belief and culture. If conditions like this persist for a long time, they will cause stunting in children *(Wardani et al., 2020)*. Apart from having assets, having health insurance is a factor that is related to the incidence of stunting *(Pertiwi et al., 2021).*

Ownership of Maternal and Child Health (KIA) books is thought to reduce the incidence of stunting. The use of KIA books does not directly reduce maternal, infant and toddler mortality rates. However, by using the KIA book, mothers and families can increase preventive and promotional efforts for maternal and child health problems, including the problem of stunting. Ownership of KIA books among children 0-59 months is still 65.9% *(Balitbangkes, 2018).* Pregnant women are also advised to consume blood supplement tablets as an effort to prevent stunting. Consuming blood supplement tablets can prevent anemia in pregnant women. Anemia is associated with stunting in children, so consuming blood supplement tablets can prevent stunting *(Widiyanto et al., 2022)*.

The prevalence of stunting from year to year tends to fluctuate, increasing in the 2007-2013 period, then decreasing in the 2014-2016 period, and increasing again in the 2017-2018 period. The Study Report on the Nutritional Status of Indonesian Toddlers (SSGBI) in 2019 decreased again at 27.7% (Ministry of Health, 2020). However, wide disparities between provinces and a relatively slow average reduction are challenges in the framework of accelerating stunting reduction to 14% by 2024. In 2019, there were 13 (thirteen) provinces that were in the very high category (≥30 %), 17 (seventeen) provinces in the high category (20-<20%). The results of the 2021 SSGI report stated that the stunting rate was 24.4% *(BKPK, 2021)*.

Aceh is the province with the highest prevalence of stunting in Indonesia, namely the fifth highest in 2018 and in 2021 it will be third after East Nusa Tenggara and West Sulawesi Provinces. The results of Riskesdas show that the prevalence of stunting decreased by 3.7% from 44.6% in 2007 to 37.3% in 2018, followed by the 2019 SSGI results, the prevalence of stunting was 34.2% and the 2021 SSGI results were 33.2% *(Indonesian Ministry of Health, 2021).*

Apart from that, the coverage of sensitive nutrition interventions in Aceh is still low, one of which is how to handle toddler feces. Only 29.48% of toddlers use toilets. The highest percentage of how toddler feces are handled is thrown away carelessly (44.10%) (Ministry of Health of the Republic of Indonesia, 2018). Access to drinking water in Aceh is also still very low, where only 59% of drinking water facilities meet health requirements *(Aceh Health Office, 2019).*

Stuntingis a very important factor in determining the quality of a child's life in the future. In general, the problem of stunting has a negative impact because it can cause slowed growth and cognitive development during adolescence and reduce productivity as an adult. Therefore, special efforts and strategies are needed to prevent the problem of stunting, especially in regions or countries that have a high level of stunting prevalence so that the quality of the nation's children becomes better *(UNICEF, 2012).*

Therefore, in this research the author is very interested in conducting research on the determinant factors of stunting among toddlers in Aceh Province in 2022. It is hoped that this research can become a reference in handling stunting in Aceh.

METHOD

Study This is an analytical survey conducted using a cross-sectional design with a quantitative approach to determine the determinants of stunting in Aceh province. This research hasin Aceh Province using SSGI secondary data for 2022. The research was carried out in October – November 2023.

Samples in health research require that the minimum sample that must be obtained must meet the strength test, namely that it must be above 80% of the calculation. In this study the strength test was obtained using a calculation formula. To calculate the test strength of research variables, the two-proportion hypothesis test sample size formula will be used. Determination of the sample size was carried out using all samples in the 2022 SSGI, totaling 15,865 samples of toddlers.

Research ethics have been issued by the Chair of the Health Research Ethics Committee (KEPPKN) of the Faculty of Medical Sciences, Syiah Kuala University (USK) with registration number: 1171012P. Ethical Exempted with letter number: 184/EA/FK/2023.

RESULTS

Univariate analysis was carried out to obtain an overview of each variable studied, namely the dependent variable (the incidence of stunting in toddlers aged 0-59 months) and independent variables which include Low Birth Weight (LBW), Number of Families, and Region.

Table 1 *(Distribution of Toddlers Based on Stunting Events.)*

Nutritional Status (TB/U)	Amount (n)	Percentage (%)
Normal	10830	68.3
Stunting	5035	31.7
Total	15865	100.0

Based on table 1, it is known that the frequency distribution of the proportion of toddlers experiencing stunting is 5035 toddlers (31.7%), while toddlers in the normal category are 10830 toddlers (88.3%). This stunting figure is the fifth highest figure in Indonesia, where the national target is 14% in 2024.

Table 2 *(Frequency Distribution of Respondents Based on Birth Weight.)*

Birth Weight	Amount (n)	Percentage (%)
No (>2500 grams)	14513	91.5
Yes (< 2500 grams)	1352	8.5
Total	15865	100.0

Based on table 2 above, it can be seen that the proportion of toddlers who have a normal birth weight category is higher (91.5%) compared to low birth weight (LBW), namely 8.5%.

Table 3 (Relationship between Toddler Birth Weight and Stunting Incidents.)

BBL	*Stunting*		Normal		Total		OR (95%CI)	*P Value*
	n	%	n	%	n	%		
No	4571	31.5	9942	68.5	14513	100	1,136	
Yes	464	34.3	888	65.7	1352	100		0.033
Total	5035	31.7	10830	68.3	15865	100	1.01–1.27	

**p- Value <0.05*

The results of the analysis show that the proportion of stunting incidents based on birth weight is greater in toddlers with a history of LBW (34.3%) compared to toddlers without LBW (31.5%). This

shows that toddlers born with LBW conditions are at greater risk of stunting compared to toddlers born normally. The results of the Chi-Square test obtained a p value = 0.033, so it can be concluded that there is a significant relationship between birth weight and the incidence of stunting. With an OR value = 1.136, this means that toddlers with a history of LBW are 1.136 times more likely to experience stunting than toddlers with a history of normal birth.

DISCUSSION

Relationship between Birth Weight and Stunting

Birth weight is categorized into two categories, namely LBW if the birth weight is less than 2500 grams and not LBW if the birth weight is greater than or equal to 2500 grams. Univariate results showed that of the 1343 research samples, 8.5% of the babies were included in the LBW category, the rest were included in the normal category, namely 91.5%. Even though the prevalence of LBW is not large, LBW children are at risk of fetal and neonatal mortality or morbidity, poor cognitive development, and an increased risk of degenerative diseases *(Achadi et al., 2020)*. The results of the study showed that a greater proportion of stunting occurred in toddlers with a history of LBW birth, namely 50.5% compared to toddlers with a normal birth history of 34.0%. This is in accordance with the results of research by Murti (2020), the prevalence of stunting in toddlers with LBW was 71.9% and 28.1% in toddlers born normally *(Murti et al., 2020)*. Research in Pesawaran Regency also found that stunting occurred more frequently in toddlers with a history of LBW (Sulistianingsih & Sari, 2018).

The statistical test results showed that there was a p-value = 0.033 relationship between birth weight and the incidence of stunting with an OR value of 1.136, meaning that toddlers with a history of LBW birth had a 1.136 times chance of experiencing stunting compared to toddlers with a normal birth history. In line with research in Kendari, toddlers with LBW have a risk of stunting 5,250 times greater than toddlers with normal weight *(Swathma et al., 2016)*. Likewise, research in Pesawaran Regency, toddlers with a history of LBW have a 17,063 times risk of stunting *(Sulistianingsih & Sari, 2018)*.

LBW is an indicator of the condition of fetal growth while in the mother's womb and is a risk factor for stunting at a later age. The course of fetal growth is influenced by nutritional conditions in the peri-conception period, namely 14 weeks before to 10 weeks after conception. Birth weight is an indication of fetal growth and development which is not only influenced by the quality and quantity of nutrients from the mother, but is also influenced by the weight, size and surface shape of the fetal placenta because the placenta functions to distribute food to the fetus from the mother *(Rusliani et al., 2022)*. Babies born with LBW can cause unsteady growth (growth faltering) during infancy which, if not handled properly, can cause stunting *(Victora et al., 2008)*. Toddlers born with LBW will only be able to catch up growth after the age of two years *(Negrato & Gomes, 2013)*. Toddlers with a history of LBW can also cause increased susceptibility to infectious diseases such as ARI, diarrhea and the risk of complications such as sleep apnea, icterus, anemia, fatigue and loss of appetite resulting in early malnutrition *(Nsiah-Asamoah et al., 2022)*. The incidence of LBW is closely related to factors such as age at pregnancy, pariahs, gestational age, chronic energy deficiency and ANC visits *(Septiani & Ulfa, 2018)*.

Stuntingis a condition where toddlers have an inappropriate length or height compared to their peers. This condition is measured by body length or height that is more than minus two standard deviations

from the median child growth standard from WHO standards. Stunting is a disruption in the growth and development of children due to chronic malnutrition and recurrent infections, which is characterized by their body length or height being below the standards set by the minister who handles government affairs in the health sector *(Ministry of Health, 2018)*.

This research covers the Aceh Province area, which is a province in Indonesia with a high prevalence of stunting, namely the fifth highest in 2018 and in 2021 it will be third after East Nusa Tenggara and West Sulawesi Provinces. The results of research on selected samples found that the prevalence of stunting in toddlers aged 12-59 months reached 35.1%. When classified again, it was found that of the 609 toddlers there were 121 (19.9%) who were severely stunted or who had a z score value smaller than -3 SD, the remaining 488 (80.1%) had a z score value greater than -3 SD. This figure is far above the threshold (cut off) that has been set as a public health problem, namely 20% *(WHO, 2020)*.

Renyoet et al (2016) conducted research on potential state losses for stunted children in Indonesia. The data analyzed is secondary data from the 2013 Basic Health Research *(Riskesdas)*, population characteristics by province, and data on labor wages or salaries. So, the study concludes that the potential national loss for stunted toddlers is around IDR 3,057 billion-IDR 13,758 billion or 0.04-0.16% of Indonesia's total GDP. Potential economic losses due to stunting in children under five in Indonesia reach IDR 1.7 million/person/year or IDR 71 million/person for 49 years (productive age 15-64 years) based on BPS 2014 *(Renyoet et al., 2016)*.

The TNP2K report in 2017 stated that there are four factors that influence the occurrence of Stunting: 1) Parenting practices which are influenced by parents' lack of knowledge about health before and during pregnancy and after birth; 2) ANC (Antenatal Care and Post-Natal Care) services are of poor quality; 3) Access to nutritious food is still lacking, because the price of nutritious food is relatively expensive; and 4) and lack of access to clean water and sanitation which can influence the occurrence of recurrent infections which have an impact on children's development (Ministry of Health, 2018).

CONCLUSION

Based on the research results and research objectives, it can be concluded thatobtained p value = 0.033, it can be concluded that there is a significant relationship between birth weight and the incidence of stunting. With an OR value = 1.136, this means that toddlers with a history of LBW are 1.136 times more likely to experience stunting than toddlers with a history of normal birth.

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