

## Research Article

## Risk Factor Analysis of Stunting Incident among Toddlers in the Work Area of the Technical Implementation Unit of the South Aceh Regency Health Primary Services

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**Abstract:** Stunting reflect chronic nutrition problem especially in the first 1000 days live that cause growth and development disruption in toddler. During 2018 there are up to 4907 (48,4%) toddlers who suffer from stunting were identified in South Aceh. Stunting are influenced by some factors such as mother's education level, social and economical status, low birth weight babies, immunization status, mothers body height, mothers age, toddler infection diseases history, maternal health status and environmental sanitation. The purpose of this study is to find out risk factors of stunting incidents in work area of implementation unit of South Aceh Regency health primary services. The type of this study is quantitative with descriptive correlational study and designed with cross sectional study. Population of the study is whole 408 of 1-5 years old toddlers and 301 of them are taken total sample based on inclusion criteria. The measuring instrument was the questionnaire modification of the Indonesian Health Ministry. Stampede scales are GEA BR90158 and microtoise SH-2A GEA to measure toddler anthropometric. Result from logistic regression shows that low birth weight babies are significantly related to stunting incidents ( $p=0,000$ ) by odds ratio 6,021, infection disease history ( $p=0,003$ ) by odds ratio 2,292 and environmental sanitation ( $p=0,026$ ) by odds ratio 1,800. Low birth weight babies have six times possibility if compared with those who not. It is expected to family to fulfill nutrition needs, evaluate growth and development status, especially low birth weight babies, as the dominant risk factor in stunting incidents.

**Keywords:** Risk Factors, Stunting, Toddler

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### INTRODUCTION

*Stunting* is one of nutrition problems that suffer toddler nowadays. It can inhibit growth and development and effected to thinking ability, susceptible to disease, high risk of Low Weight Baby Birth (LWBB) labor until decreased productivity and caused poverty (Kemenkes RI, 2015). *Stunting* indicate chronic nutrition problem in first 1000 days of live. This condition can be presented with z-score of height based on aged is less than -2 on deviation standard (SD) according to growth indicator standard which be appointed by *World Health Organization* (WHO) (WHO, 2018).

The study by Akombi *et al.*, (2017) in Nigeria showed that the risk factor that significantly related to stunting among children 0-23 months and 0-59 months

is mother height, family socio-economic status (poor and poorest), long of lactation, and diarrhoea in recent two weeks before research was conducted. Meanwhile the study conducted by Setiawan *et al.*, (2018) in Padang, Indonesia stated that there is significant correlation between level of nutrition intake, history of infectious disease, low weight baby birth, level of education, and socio-economic status with stunting incident.

According to basic health research by Indonesian Ministry of health (2018) Aceh was the third highest of stunting incident in Indonesia. In 2019, Aceh province has 37,3% toddler with stunting. There are 10.127 (48,8%) toddler in South Aceh district are suffered from stunting (Dinkes Aceh Selatan, 2019).

South Aceh District, where the study will be conducted, is a district in Aceh which mostly citizen with low-educated level, it is proved by up to 3.709 people don't have any elementary school certificate, high of infectious disease (*Common Cold*) on 13.088 toddler, 11.466 toddlers is suffered from Upper Respiratory Tract infection and 2.264 with diarrhea, unseparated immunization, high number of low weight babies in 97 people (2,6%), and only (39,62%) people have proper and healthy toilet (South Aceh Health Department Profile, 2016).

Based on result from interview of Local Primary Health Services, nothing study which is conducted regarding stunting risk factors. Local government has done various efforts to reduce stunting incidents yet the stunting rate is still high there.

## METHOD

The type of this study is quantitative with cross design. Sample of this study is taken with total sampling technique. Population is all toddlers in Technical Implementation Unit of South Aceh District Health Center Service Work Area with inclusion criteria and there are 301 respondents are involved in

the study. Data was collected by using modified questionnaire from Indonesian Ministry of Health, stamped scales GEABR90158 and *microtoise* SH-2A GEAfor anthropometric measurement. The data is analyzed with (a) Univariate analysis for frequency distribution, (b) Bivariate analysis with *Chi Square test* and Multivariate is analyzed with Logistic Regression test.

## RESULT

- **Univariate Analysis**
- **Independent Variable and Respondent Characteristics**

Univariate analysis shows that most of respondents are women with low education level, dominantly with low income family with toddler, most mother in good health status, mother age in latest pregnant are in no-risk category, most of mothers have a tall body, most toddlers not have any low weight baby birth, most of toddlers have incomplete immunization status, have infectious history (Upper Respiratory Tract Infection and Diarrhea in latest 3 months) and most of families don't have a proper and health sanitation.

**Table 1.** Respondent Characteristic Frequency Distribution among Toddler in South Aceh Primary Health Services Work Area(n=301)

No	Variable Independent	(f)	(%)
	Gender of Toddler		
1.	Male	145	48,2
	Female	156	51,8
	<b>Total</b>	<b>301</b>	<b>100</b>
	Mother's Education Level		
2	Low	150	49,8
	Middle	83	27,6
	High	68	22,6
	<b>Total</b>	<b>301</b>	<b>100</b>
	Family's income/month		
3	High: ≥Rp. 2. 916. 810	118	39,2
	Low: <Rp 2. 916. 810	183	60,8
	<b>Total</b>	<b>301</b>	<b>100</b>
	Mother's health history		
4	i.1.a. Good	284	94,4
	i.1.b. Poor	17	5,6
	<b>Total</b>	<b>301</b>	<b>100</b>
	Mother's Age in Latest Pregnancy		
5	Age< 20 Years Old or > 35 Years Old	39	13,0
	20-35 Years Old	262	87,0
	<b>Total</b>	<b>301</b>	<b>100</b>
	Mother's Body High		
6	1 ≥150 cm	272	90,4
	2 <150 cm	29	9,6
	<b>Total</b>	<b>301</b>	<b>100</b>
	Toddler Body Weight at Birth		
7	. ≥ 2500 gram	270	89,7
	. < 2500 gram	31	10,3
	<b>Total</b>	<b>301</b>	<b>100</b>
8	Immunization Status		

No	Variable Independent	(f)	(%)
	Complete	132	43,9
	Incomplete	169	56,1
	<b>Total</b>	<b>301</b>	<b>100</b>
	Toddler Infectious Disease History		
9	Have	188	62,5
	Not Have	113	37,5
	<b>Total</b>	<b>301</b>	<b>100</b>
	Environmental Sanitation		
10	Healthy	124	41,2
	Not Healthy	177	58,8
	<b>Total</b>	<b>301</b>	<b>100</b>

Source: *Primary Data, 2019*

• **Dependent Variable**

Number of toddlers who have and don't have stunting in South Aceh Primary Health Services Work Area

**Tabel 2.** Stunting Incidents Frequency Distribution among Toddler in South Aceh Primary Health Services Work Area (n=301) (n=301)

No	Dependent Variable	(f)	(%)
	Stunting Incident		
1.	a. Stunting	111	36,9
	b. Without stunting	190	63,1

Source: *Primary Data (processed in 2019)*

• **Bivariate Analysis Result**

Correlation between independent variable with stunting incidents among toddler in South Aceh

Primary Health Services Work Area using computer application with Chi-Square Test. The analysis result is served in the table below:

**Tabel 3.** Correlation Between Independent Variable And Dependent Variable Among Toddler In South Aceh Primary Health Services Work Area(N=301)

No	Variable Independent	Variable Dependent ( <i>Stunting Incidents</i> )		Total f (%)	$\alpha$	p-value
		Stunting f (%)	Without stunting f (%)			
1.	<b>Education Status</b>					
	Low	67 (44,7)	83 (55,3)	150 (100)	0,05	0,020
	Mid	24 (28,9)	59 (71,1)	83 (100)		
	High	20 (29,4)	48 (70,6)	68 (100)		
	<b>Socio-Economic Status</b>					
2.	High	35 (29,7)	83 (70,3)	118 (100)	0,05	0,050
	Low	76 (41,5)	107 (58,5)	183 (100)		
3.	<b>Health Status during Pregnant History</b>					
	Good	106 (37,3)	178 (62,7)	284 (100)	0,05	0,691
	Poor	5 (29,4)	12 (70,6)	17 (100)		
	<b>Mother's Age in Latest Pregnancy</b>					
4.	High Risk	15 (38,5)	24 (61,5)	39 (100)	0,05	0,967
	No-Risk	96 (36,6)	166 (63,4)	262 (100)		
5.	<b>Mother's Body Height</b>					
	Tall	98 (36,0)	174 (64,0)	272 (100)	0,05	0,465
	Short	13 (44,8)	16 (55,2)	29 (100)		

No	Variable Independent	Variable Dependent (Stunting Incidents)		Total f (%)	$\alpha$	p-value
		Stunting f (%)	Without stunting f (%)			
<b>6.</b>	<b>Low Weight Baby Birth History (LWBB)</b>					
	LWBB	23 (74,2)	8 (25,8)	31 (100)	0,05	0,000
	Non-LWBB	88 (32,6)	182 (67,4)	270 (100)		
<b>7.</b>	<b>Immunization</b>					
	Complete	40 (30,0)	92 (69,7)	132 (100)	0,05	0,049
	Incomplete	71 (42,0)	98 (58,0)	169 (100)		
<b>8.</b>	<b>Toddler Infectious Disease History</b>					
	Have	81 (43,1)	107 (56,9)	188 (100)	0,05	0,006
	Not Have	30 (26,5)	83 (73,5)	113 (100)		
<b>9.</b>	<b>Environmental Sanitation</b>					
	Healthy	34 (27,4)	90 (72,6)	124 (100)	0,05	0,006
	Not Healthy	77 (43,5)	100 (56,5)	177 (100)		

Source: *Primary Data, 2019*

Based on table 3 shows that there is significant correlation between mother’s education level with stunting incidents in  $\alpha = 0,05$  and p-value  $0,020 < 0,05$ . There is significant correlation between socio-economic status with stunting in  $\alpha = 0,05$  and p-value  $0,050 \leq 0,05$ . There is no correlation between mother’s health status during pregnant with stunting incidents in  $\alpha = 0,05$  and p-value  $0,691 > 0,05$ . There is no correlation between mother’s age in latest pregnancy with stunting incidents in  $\alpha = 0,05$  and p-value  $0,967 > 0,05$ . There is no correlation between mother’s body height with stunting incidents in  $\alpha = 0,05$  and p-value  $0,465 > 0,05$ . There is significant correlation between LWBB with stunting Incidents in  $\alpha = 0,05$  and p-value  $0,000 < 0,05$ .

There is significant correlation between immunization status with stunting incidents in  $\alpha = 0,05$  and p-value  $0,049 < 0,05$ . There is significant correlation between toddler infectious disease history with stunting incidents in  $\alpha = 0,05$  and p-value  $0,006 < 0,05$ . And there is significant correlation between environmental sanitation with stunting in  $\alpha = 0,05$  and p-value  $0,006 < 0,05$ .

**2. Multivariate Analysis Result**

In the first modelling stage, six variables which is in bivariate test will be analyzed in multivariate analysis simultaneously.

**Table 4.** First Stage Analysis Result on Logistic Regression Test by Enter Model for independent variable among Toddler in South Aceh Primary Health Services Work Area(n=301)

Variable	B	Sig.	Exp(B)	95% C.I.for EXP(B)	
				Lower	Upper
Mother’s Education Level	0,256	0,132	1,291	0,926	1,801
Socio-Economic Status	0,419	0,131	1,520	0,883	2,619
LWBB History	1,786	0,000	5,963	2,458	14,468
Immunization Status	0,413	0,143	1,512	0,869	2,629
Infectious Disease History	0,713	0,016	2,040	1,145	3,635
Environmental Sanitation	0,603	0,029	1,828	1,065	3,140

Source: *Primary data, 2019*

Based on table 4. It can be concluded that in the first logistic regression, p-value  $< 0,05$  is LWBB history ( $p=0,000 < 0,05$ ), toddler infectious disease history ( $p=0,016 < 0,05$ ), and environmental sanitation

( $p=0,029 < 0,05$ ), because of there are p-value over than  $0,05$ , therefore second modeling stage should be continued.

**Tabel 5.** Second Stage Analysis on Logistic Regression Test with Enter Model in South Aceh Primary Health Services Work Area(n=301)

Variable	B	Sig.	Exp(B)	95% C.I.for EXP(B)	
				Lower	Upper
LWBB history	1,795	0,000	6,021	2,522	14,378
Infectious Disease History	0,829	0,003	2,292	1,335	3,936
Environmental Sanitation History	0,588	0,026	1,800	1,073	3,019

Source: *primary data, 2019*

Based on table 5. It can be concluded that LWBB history is the most significantly related variable ( $p=0,000 < 0,05$ ) with *odds ratio* 6,021 (CI: 2,522-14,378). So it can be stated that LWBB history is six times risky toward stunting incident than those who don't have LWBB history in South Aceh Primary Health Services Work Area after regression logistic test simultaneously done with infectious disease history and environmental sanitation.

## DISCUSSIONS

Mother's education factor is significantly related with stunting incidents with *p-value* 0,020, this finding is in line with Rahayu *et al.*, (2015) who stated that mother who has lower education level has five times risk on stunting child than those who has higher education level. Mother's education levels is related with health status because mother has vital role in treat and take care of toddler especially in nutrition and toddler health. Another study that conducted by Ni'mah and Nadhiroh (2015) which stated that mother with lower education level influencing their ability to receive information. The mother who has a good knowledge is more able to process food, serving nutritious food and can maintain food's hygiene and its quality.

Socio-economic factor has correlation with stunting incident *p-value* 0,050 this is in line with the study which conducted by Patimah *et al.*, (2016) the result showed that the family whose low income level is one of risk factors stunting incidents in children. Most parents with low socio-economic level has lower family's income (<2 juta/bulan). By those incomes, it is hard for family to fulfill nutritious food needs and get the better health status.

Mother health status during pregnant (infectious disease and maternal anemia) is not related to stunting incidents *p-value* 0,691. This is appropriate with study result which conducted by Ruaida (2013), it showed that maternal health status and anemia were not related to stunting incidents. However pregnant woman with lack of energy made nutrition need for fetus growth and development process will be hampered so the mother has higher risk of LWBB labor, LWBB situation would be effected on the stunting incident. Based on interview which did in South Aceh Primary Health Services Work Area, there are a number of

pregnant woman with Chronic Energy Deficiency in these area.

Mother's age in latest pregnancy is not a factor that related to stunting incidents *p-value* 0,967. This finding is not in line with the study from Rochmah (2017) who stated mother's age is not related to stunting in child, even young mother and lack of experience on taking care of children, they would learn from their parents on look after their children. So they will apply the caring model by hereditary.

Mother's height body factor is not related to stunting incidents *p-value* 0,465. This result is not in line with the study that conducted by Amin & Julia (2016) mothers those whose short body has higher risk on giving birth of short child. This incompatibility is caused by the existence of other factors which more dominant be risk factor of stunting incidents such as, LWBB factors, socio-economic status, education and environment sanitation.

Low Weight Baby Birth (LWBB) history is a related factor with stunting incidents *p-value* 0,000 this is in line with study by Swathma *et al.*, (2016) which showed the toddler with LWBB history has five times higher risk of stunting than those who born with normal body weight. Similar findings from Jogender & Kanya (2019), the study showed that LWBB is significantly related to stunting incidents. According to some latest research have support this study and shows that baby with LWBB has six times possibility of stunting than those have a normal birth weight in South Aceh Primary Health Services Work Area.

Immunization status factor is related to stunting incident *p-value* 0,049 this findings is in line with study which conducted by Berendsen *et al.*, (2016) they stated that most of stunting toddler have incomplete immunization status, and the toddler whose complete the immunization procedure growth normally. Logistic Regression analysis shows that the toddler who has incomplete immunization status has four times higher risk of stunting. Toddler those not vaccinated has weak immunity and irritates to suffer from infectious disease. Infection process will influence child appetite and lack of nutritious needs cause the disruption growth and development in toddler.

Infectious disease history among toddler is related to stunting incident *p-value* 0,006 these is in line with study by Oliveira *et al.*, (2015) stunting is significantly related to toddler infection, based on the study parasite infectious in digestive tract will influence nutrition absorbance in their body, ineffective nutrition absorbance will influence toddler growth and development.

Environment sanitation factor is related to stunting incidents *p-value* 0,006. This result is supported by last study by Wulandari, Rahayu, and Darmawansyah (2019) which showed there is correlation between sanitary and stunting incidents. Difficult access and poor sanitation can impact the stunting on children. Poor sanitation can be influenced by low of socio-economic and education status which are influencing family's ability on providing proper sanitation for family members. Poor sanitation also effecting health status, especially for toddler so they will susceptible with infection that can inhibit nutrition absorbance, growth and development process (Indonesian Ministry Of Health, 2016).

## CONCLUSION

LWBB history has significant correlation with stunting incident. LWBB history makes toddler has 6 times risk higher to suffer from stunting than those who don't have LWBB history.

## SUGESTIONS

Fulfill nutrition needs in toddler with LWBB history such as exclusive lactation until 2 years old, various complementary foods after 6 months also growth and development monitoring in order to help children to reach growth and prevent from stunting.

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