Analysis of Stunting Risk Factors in Toddlers

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Abstract

Stunting is the impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation. In 2018, 22,2% toddlers with stunting in the world and 36,4% toddlers with stunting in Indonesia. Situbondo is a district with the third rank of stunting cases in the province of East Java, Indonesia. As of February 2019, the Banyuputih Community Health Care has the highest stunting rate of toddlers in Situbondo Regency, which is 42.7%, with details of 25.21 very short children and 17.49% short. The purpose of this study was to determine the risk factors for stunting in toddlers in the Banyuputih Community Health Center, Situbondo Regency, province of East Java, Indonesia. This research was a quantitative study with a cross-sectional design. The sample in the study was 274 toddlers in the Banyuputih Community Health Center working area. The sampling technique used was proportional random sampling. This research instrument used an observation sheet in collecting the independent and dependent variables. Data analysis was performed using univariate, bivariate and multivariate tests. The results showed that anemia (Pvalue 0.014) and family income (Pvalue 0.000) were proven to be associated with the incidence of stunting in toddlers in the Banyuputih Community Health Center Work Area. From the OR value of anemia, it is obtained 3.504, meaning that mothers who have anemia during pregnancy have a chance to have children with stunting by 3.504 times compared to mothers who do not experience anemia during pregnancy. Likewise, from the OR value of family income, it was obtained 361,999, meaning that toddlers who were in families with an income less than the regional minimum wage had a chance of stunting of 361,999 compared to toddlers from families with income above the regional minimum wage.

Keywords: *Risk Factors, Stunting, Toddlers.*

Introduction

Stunting is the impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation. Children are defined as stunted if their height-for-age is more than two standard deviations below the WHO Child Growth Standards median(1).

In 2025, Stunting is estimated that around 171 million to 314 million toddlers are stunted and 90% of them are in Africa and Asia. The Global Nutrition Report shows Indonesia is included in 17 countries out of 117 countries, which have three nutritional problems (stunting, wasting and overweight) in toddlers(2).

Stunting not only affects suboptimal growth, but also has difficulty achieving optimal physical and cognitive development, has a low level of intelligence, be more susceptible to disease and decrease productivity as adults(3)(4).

There are many factors of stunting, the effect of lack of energy and nutrition intake and infection. Household and family factors, complementary feeding, and breastfeeding are also direct factors causing stunting(5).

The incidence of stunting in Indonesia is still high and decreased in 2018 with a prevalence of 30.8% compared to 2013 (37.2%) and 2010 (35.6%). Where the prevalence of stunting was 30.8% in 2018 consisting of 11.5% very short and 19.3% short. With this number, Indonesia ranks 5th most stunting in the world (this condition is only better than India, China, Nigeria, and Pakistan). Meanwhile, East Java is a province that has a high prevalence, namely 26.7%.(6)

Situbondo District has a high and increasing prevalence of stunting. Situbondo is also the district with the third rank of stunting cases in East Java. Based on Monitoring Data on Nutritional Status of East Java Province in 2016, Situbondo Regency has a prevalence of toddlers with stunting of 23.0%, in 2017 it was 30.5% and as of February 2018, of 44,386 toddlers, 30.3% were recorded as having stunting.

Based on the results of interviews with the data and information section of the Situbondo District Health Office, it was stated that so far there was no special recording of stunting. Until 2018, only sufficient data on the Nutrition Status Monitoring Survey which is carried out by the Province every year. And only in 2019, the number of it is recorded for stunting detection, even then only in the weighing month (February and August). So that there has been no specific analysis per Community Health Center/Subdistrict related to the stunting case in Situbondo until 2019.

Based on the report for the weighing month of February 2019, the Banyuputih Community Health Center has the highest stunting rate of toddlers in Situbondo Regency, which is 42.7%, with details of 25.21 very short children and 17.49% short[7]. Therefore, it is necessary to conduct research on the analysis of risk factors for stunting in toddlers in the Banyuputih Health Center, Situbondo Regency.

The purpose of this study was to determine the risk factors for stunting in toddlers so that the risk factors for stunting in the Banyuputih Community Health Center can be addressed appropriately.

Material and Method

The research was a quantitative study with a cross-sectional design. The research's location was conducted in the Banyuputih Community Health Center, Situbondo Regency, East Java, Indonesia. The research was conducted for 10 months in 2020. The population in this study were all toddlers who were measured Height/ age in the Banyuputih Community Health Center Work Area. The sample in the study was 274 Toddlers in the Banyuputih Community Health Center with inclusion and exclusion criteria. The sample was calculated using a formula[8]:

$$n = \frac{Z^2_{1-\frac{\alpha}{2}}\ P(1-P)N}{d^2(N-1) + Z^2_{1-\frac{\alpha}{2}}\ P(1-P)}$$

Inclusion Criteria:

1. Toddlers aged 0-59 months
2. Toddlers are included in the data where Height/ Ages measurements were taken in the last weighing month
3. Toddlers have complete supporting data

Exclusion Criteria:

1. Incomplete supporting data

The sampling technique used was proportional random sampling. With the following proportions:

1. Banyuputih Village = (113/949) x 100 = 12% x 274 = 33 Ballita
2. Sumberejo Village = (310/949) x 100 = 33% x 274 = 90 toddlers
3. Sumberanyar Village = (328/949) x 100 = 34% x 274 = 93 toddlers
4. Sumberwaru Village = (199/949) x 100 = 21% x 274 = 58 toddlers

The instruments used in this study were observation sheets, supporting documents in the form of a cohort of toddlers, the Mother and Child Health's Handbook, Mother and Child Health and Nutrition reports.

Data was analyzedwuth univariate, bivariate and multivariate analyzes. Univariate analysis was performed on each variable from the research results by describing each variable by making a frequency distribution table. Bivariate analysis was carried out to see the relationship between each independent and dependent variable using the chi square test. And Multivariate with multiple logistics analysis.

Result and Discussion

The research results are as follows:

Univariate Analysis:

Table 1. General description of stunting in the Banyuputih Community Health Center

No.	Inf	F	%
1	Normal	203	74
2	Stunting	71	26
Total		**274**	**100**

Based on Table 1, it showed that some of the toddlers with stunting in the Banyuputih Health Center work area were 26%.

Table 2. Overview of Risk Factors for Toddler Stunting in the Banyuputih Health Center Work Area

No.	Inf	F	%
Children's Characteristic			
Age			
1	0-12 m	130	58
2	>12-24 m	33	12
3	>24-36 m	39	14
4	>36-48 m	29	11
5	>48 m	13	5
Total		274	100
Sex			
1	Male	124	45
2	Female	150	55
Total		274	100
Birth Weight			
1	≥2500gr	256	93
2	<2500gr	18	7
Total		274	100
Birth Body Length			
1	≥48cm	221	81
2	<48cm	53	19
Total		274	100
Breastfeeding			
Early Initiation of Breadfeeding			
1	Yes	274	100
2	No	0	0
Total		274	100
Exlusive Breatfeeding			
1	Yes	239	87
2	No	35	13
Total		274	100
Infection Desease			
Diarrhea			
1	No	264	96
2	Yes	10	4
Total		274	100
Upper Respiratory Tract Infection			
1	No	0	0
2	Yes	274	100
Total		**274**	**100**
Maternal and Family's Factor			
Anemia (Mother's Nutrition Status)			
1	No	205	75
2	Yes	69	25
Total		**274**	**100**
Upper Arm Circumference (Mother's Nutrition Status)			
1	Normal	245	89
2	Less	29	11
Total		**274**	**100**
Mother's Height			
1	≥150cm	208	76
2	<150cm	66	24
Total		**274**	**100**
Family's Income			
1	≥Regional Minimum Wage	221	81
2	< Regional Minimum Wage	53	19
Total		**274**	**100**
Mother's Education			
1	University	8	3
2	Senior High School	13	5
3	Junior High School	118	43
4	Elemntary High School	135	49
5	Not go to school	0	0
Total		**274**	**100**
Numbers of Family Member			
1	2-4 members	151	55
2	5-7 members	112	41
3	>7 members	11	4
Total		**274**	**100**
Environment			
Vitamin A			
1	Yes	274	100
2	No	0	0
Total		**274**	**100**

Based on Table 2, it showed that the characteristic factors of children aged 0-12 months are 58%, female gender is 55%, underweight was 7%, and birth length was 19%. In the aspect of breastfeeding, 100% did early initiation of breastfeeding and 13% did not exclusive breastfeeding. In fact, a history of infectious disease had a history of diarrhea by 4%, and a history of ARI by 100%. Maternal and family factors of anemia during pregnancy were 25%, had a lower arm circumference of less than 11%, short height of mother (<150cm) was 24%, family income was less than the minimum wage rate of 19%, mother's education was mostly graduated from elementary school by 49%, the number of family members was mostly 2-4 people and 100% of environmental factors consume vitamin A.

So based on the results of the univariate test at the bivariate test stage for breastfeeding factors (early initiative breastfeeding variable), infectious disease factors (upper respiratory tract infection variable) and environmental factors (Vitamin A variable) analysis cannot be carried out because the data is homogeneous.

Bivariate AnalysisL From bivariate analysis, it showed that the statistical test results of birth weight obtained the value of Pvalue = 0.009 (P ≤ 0.05), with a degree of significance α (5%), it could be concluded that the alternative hypothesis (Ha) was accepted or the null hypothesis (Ho) was rejected which showeda relationship between birth weight and the incidence of stunting. On the other hand, age (Pvalue 0.095), gender (Pvalue 0.512), and body length (Pvalue 0.334) had no relationship with the incidence of stunting.

The results of this study were according to Paudel, et al (2012) which showed that birth weight less than 2500gr had a higher risk of becoming stunting**.**

The results of the exclusive breastfeeding statistical had Pvalue = 0.025 (P ≤ 0.05), with a degree of significance α (5%), it could be concluded that the alternative hypothesis (Ha) was accepted or the null hypothesis (Ho) was rejected which showed a relationship between exclusive breastfeeding and the incidence of stunting. The results of this study were in accordance with Ni'mah & Siti (2015) and Fikadu, et al (2014), namely toddlers who did not receive exclusive breastfeeding were at high risk of stunting.

The results of the diarrhea statistical test had Pvalue = 0.021 (P ≤ 0.05), with a degree of significance α (5%), it could be concluded that the alternative hypothesis (Ha) was accepted or the null hypothesis (Ho) was rejected which indicates there was a relationship between diarrhea and the incidence of stunting.

The results of this study were as according to Bhutta, et al (2013), Stewart et al (2013), namely diarrhea could interfere with the absorption of nutrients. Diarrhea occurring five or more times before the age of two is estimated to contribute 25% to the incidence of stunting.

The statistical test results for anemia, upper arm circumference, mother's height, family income obtained the value of Pvalue = 0.000 (P ≤ 0.05), with a degree of significance α (5%), it could be concluded that the alternative hypothesis (Ha) was accepted. or the null hypothesis (Ho) was rejected, which indicates a relationship among anemia, upper arm circumference, mother's height, family income and the incidence of stunting. On the other hand, for mother's education (Pvalue 0.510), the number of family members (Pvalue 0.238) had no relationship with the incidence of stunting.

The results of this study were consistent with Lestari et al (2014), Nadiyah et al (2014), Oktariana and Sudiarti (2014) that there was a relationship among anemia, upper arm circumference, and mother's height with the incidence of stunting. Likewise, this study was in accordance with Bishwakarma (2011) that family income will make it easier for toddlers to fulfill their nutrition and easily get access to health services so as to reduce the risk of stunting.

Multivariate Analysis:

Table 3. Multivariate Model Candidate Selection

Variable	P value
Age	0,95*
Sex	0,512*
Birth Weight	0,009
Birth body length	0,334*
Exclusive Breastfeeding	0,025
Diarrhea	0,021
Anemia	0,000
Upper Arm Circumference	0,000
Mother's Height	0,000
Family Income	0,000
Mother's Education	0,510*
Number of Family Member	0,228

Based on Table 3, it showed that there were 8 out of 12 variables that can proceed to the next stage, namely those with a value <0.25, including birth weight, exclusive breastfeeding, diarrhea, anemia, upper arm circumference, mother's height, family income and number of family members.

Table 4. Summary of Modeling Results

Variable	Model 1	Model 2
Birth Weight	0,198	-
Exclusive Breasfeeding	0,795	-
Diarrhea	0,093	-
Anemia	0,033	0,014
Upper Arm Circumference	0,07	-
Mother's Height	0,456	-
Family Income	0,000	0,000
Number of Family Members	0,727	-

Based on Table 4 it showed from modeling 1 that can pass to modeling stage 2, namely 2 of the 8 variables with the P value < 0.05, namely anemia and family income.

Table 5. Analysis of Risk Factors for Toddlers with Stunting Incidence in the Banyuputih Health Center Work Area

Variable	B	Wald	Pwald	OR 95%CI
Anemia	1,254	5,980	0,014	3,504 (1,283-9,572)
Family Income	5,892	31,857	0,000	361,999 (46,794-2,800E3)

Based on Table 5, it showed that anemia and family income were proven to be related to the incidence of stunting in toddlers in the Banyuputih Health Center Work Area. From the OR value of anemia, it was obtained 3.504, meaning that mothers who had anemia during pregnancy had a chance to have children with stunting by 3.504 times compared to mothers who did not experience anemia during pregnancy. Likewise, from the OR value of family income, it was obtained 361,999, meaning that under-fives who were in families with an income less than the Regional Minimum Wage had a chance of stunting of 361,999 compared to toddlers from families with income above the Regional Minimum Wage.

Conclusion

The results showed that anemia (Pvalue 0.014) and family income (Pvalue 0.000) were proven to be associated with the incidence of stunting in toddlers in the Banyuputih Community Health Center. From the OR value of anemia, it was obtained 3.504, meaning that mothers who had anemia during pregnancy had a chance to have children with stunting by 3.504 times compared to mothers who did not experience anemia during pregnancy. Likewise, from the OR value of family income, it was obtained 361,999, meaning that toddlers who were in families with an income less than the regional minimum wage had a chance of stunting of 361,999 compared to toddlers from families with income above the regional minimum wage.

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Conflict of Interest: None

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