

# Determinant Factors on Stunting Incidence among Children Age 6-24 Months, Pemalang, Central Java: A Case Study

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## ABSTRACT

**Background:** Stunting among children under five can be caused by various factors, including inadequate food intake, characteristics of children, history of infectious diseases, family care pattern, and quality of health services. The dominant cause of stunting is different in each region. This study aimed to determinant the factors on stunting incidence among children age 6-24 months, Pemalang, Central Java.

**Subjects and Method:** This was a case control study conducted in July 2019 in the work area of the Kebondalem Community Health Center in Pemalang, Central Java. A total of 142 stunted children aged 6-24 months were selected for this study. The dependent variable of this study was stunting. The independent variables were nutritional intake, immunization status, hygiene, exclusive breastfeeding, parental education, occupation, family income, and a history of infectious diseases. Data were collected using anthropometric measurements and interviews with a questionnaire. Data were analyzed using logistic regression.

**Results:** Mother's occupation (OR= 0.26; 95% CI= 0.01 to 0.78; p= 0.035;), history of exclusive breastfeeding (OR= 0.07; 95% CI= 0.02 to 0.25; p= 0.001), history of infectious disease (OR= 0.008; p= 0.010), Nutritional intake (OR= 9.44; 95% CI=1.88 to 47.43; p= 0.006), and they were statistically significant.

**Conclusion:** Mother's occupation, history of exclusive breastfeeding, history of disease infection, and nutritional intake are factors associated with the risk of stunting.

**Keywords:** mother's occupation, history of exclusive breastfeeding, history of disease infection, and nutritional intake, stunting

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## BACKGROUND

Short stature or stunting is a result of lack of nutritional intake, poor health conditions and poor parenting. Stunting is characterized by height that is not suitable for age where the measurement results are less than -2SD / standard deviation (stunted) and less than -3SD (severely stunted) (Ministry of Health, 2016; Ridiyah et al., 2015). Based on the results of Basic Health Study (Riskesdas) the prevalence of stunting in Indonesia is 36.8% (2007), 35.6% (2010), 37.2% (2013) and 30.8% (2018)

(Ministry of Health, 2007; Ministry of Health, 2010; Ministry of Health, 2013; Ministry of Health, 2018)

Even though stunting prevalence has decreased, the prevalence is much higher than the prevalence rate of other nutritional status, namely malnutrition (17.7%), thinness (10.2%), and obesity. (8%) in 2018. Central Java is included in 18 provinces with a high prevalence of stunting (30% to <40%) where Pemalang Regency is one of the 10 priority cities/ districts for stunting intervention with a prevalen-

ce of 46.28% with a total of 57,370 children under five (Ministry of Health, 2018).

Stunting can have an impact on children's survival. Short-term and long-term impacts on children under five due to stunting include developmental and growth delays. This delay, causes low cognitive abilities, motor skill, and less height. This will lead to decreased performance, lower productivity and an increased risk of degenerative disease (Hoddi-nott et al., 2013).

The magnitude of the impact of stunting on children under five, increases efforts to prevent stunting by exploring the risk factors for stunting. The incidence of stunting among children under five can be caused by various factors, including inadequate food intake, characteristics of children under five, history of infectious diseases, family care patterns, and quality of health services (Shrimptin et al., 2006). Nutritional intake consists of macro and micro nutrient intake. In terms of macro nutrient intake, continuous lack of energy among children under five can lead to weight loss and poor nutritional status. This triggers the inhibition of the process of height growth among children under five (Almatsier, 2009).

Lack of protein intake among children under five can also result in growth and development disorders as well as inhibition of bone maturity among children under five (Oktarina and Sudiarti, 2013). Whereas in micronutrient intake, iron deficiency causes disturbances in the immune system of children under five so that they are susceptible to infection and infection (Malde et al., 2010). Apart from iron, deficiency of minerals such as zinc can disrupt the body's metabolism due to inhibition of GH (Growth Hormone) production and reduced IGF-1 (Insulin Like Growth Factor-1). This causes an increased risk of stunting (Adriani

and Wirjatmadi, 2012). Therefore, the aim of this study is to further analyze the impact of nutritional intake on the incidence of stunting in the population of children aged 6-24 months in the working area of community health center Kebondalem, Pemalang Regency.

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## SUBJECTS AND METHOD

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### 1. Study Design

This was a case control study conducted from July 2019 in the Kebondalem Community Health Center in Pemalang Regency which includes 6 villages (Tambakrejo, Lawangrejo, Wanamulya, Bojongbata, Bojongnangka, and Kebondalem).

### 2. Population and Sample

The samples were children under five aged 6-24 months and were selected based on multiple sampling, cluster and consecutive techniques.

### 3. Study Variables

The dependent variable was stunting. The independent variable was intake of nutrition. Confounding variables were immunization status, hygiene, exclusive breastfeeding, parental education, occupation, family income, parenting style and a history of infectious diseases.

### 4. Study Instruments

Data collection was carried out by anthropometric measurements including weight and height measurements and interviews using a questionnaire.

### 5. Data Analysis Data

The data of this study were analyzed using logistic regression tests.

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## RESULTS

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### 1. Characteristics of respondents

The results of this study are shown in Table 1-3. Table 1 shows that the total participants were 142 children under five aged 6-24 months

consisting of 64 stunting and 78 non-stunted children under five. A sample of 58.5% were male and 41.5% were female. Of the 142 stunting and non-stunted children under five with family characteristics include maternal education (<High School= 74.6%, ≥ High School= 25.4%), parents' work (working= 46.5% and not

working= 53.5%), and family income (<minimum wage region= 42.3% and ≥ minimum wage region= 57.7%).

The following is a description of the characteristics of the study respondents which can be displayed in Table 1.

Table 1. Characteristics of respondents in the work area of Community health center Kebondalem

Variables	Stunting		Non-Stunting	
	n	%	n	%
<b>Gender</b>				
Female	24	26.6	35	32.4
Male	40	37.4	43	45.6
<b>Maternal education</b>				
<High School	48	45.3	58	54.7
≥ High School	16	44.4	20	55.6
<b>Work Status</b>				
Working	33	50	33	50
Not working	31	40.8	45	59.2
<b>Family income</b>				
<Minimum wage	31	51.7	29	37.2
≥ Minimum wage	33	40.2	49	59.8

Table 2. Full Model Stunting Risk Factors

Variables	Coefficient	OR	95% CI	p
<b>Gender</b>				
Female	-0.34	0.10	0.01 to 1.19	0.069
Male				
<b>maternal education</b>				
<high school	0.47	1.60	0.33 to 7.62	0.560
≥ high school				
<b>Family income</b>				
<minimum wage region	3.12	22.61	0.83 to 615.95	0.064
≥minimum wage region				
<b>Employment Status</b>				
Work	-3.65	0.26	0.01 to 0.78	0.035
Not Working				
<b>History of Infectious Disease</b>				
Infection	-2.68	0.07		
Healthy			0.02 to 0.25	0.001
<b>Exclusive breastfeeding</b>				
Yes	-4.78	0.01	0.002 to 0.43	0.001

None				
<b>Hygiene</b>				
Good	1.17	3.21	0.92 to 11.27	0.068
Poor				
<b>Nutritional Intake</b>				
Poor	2.02	9.44	1.88 to 47.423	0.006
Normal / Sufficient				

Full table model of risk factors for stunting, shows no statistical relationship between sex, maternal education, family income, and hygiene status. There is a statistical relationship between employment status, history of infectious disease, exclusive breastfeeding, and stunting among children aged 6-24 months ( $p < 0.05$ ), OR  $< 1$  and CI (wide confidence interval). In this study, there was a significant relationship between nutritional intake and stunting among children aged 6-24 months (OR = 9.44; 95% CI = 1.88 to 47.43;  $p = 0.006$ ). Children under five who lack nutritional intake aged 6-24 months have a 9.438 times risk of experiencing stunting compared to children under five with adequate nutritional intake aged 6-24 months.

## DISCUSSION

Among the many risk factors that cause stunting, nutritional intake is the dominant and main factor as a cause of occurrence the incidence of stunting among children under five. Children under five with insufficient nutritional intake will be at risk of stunting 9.44 times higher than children under five who have adequate nutritional intake. This is in line with study by Oktarina and Sudiarti (2013) which states that children under five with low energy intake have a 1.28 times greater risk of experiencing stunting compared to children under five who have sufficient energy levels (Oktarina and Sudiarti, 2013). The same results were also found in a study conducted by Nungo (2012) on children under five aged 1-5 years in Kenya

and Hidayati et al. (2010) on children under five aged 1-3 years in Surakarta concluded that children who had an inadequate level of protein had a 3.46 times risk of becoming stunted compared to children under five with adequate protein intake (Nungo et al., 2012; Hidayati et al., 2010). Study conducted by Assis (2001) showed that children with insufficient fat intake (0.36g / day) had 1.83 times increase in stunting (95% CI = 1.05 to 3.20) compared to those who had an adequate diet (Amo et al., 2004).

Nutritional intake affects the incidence of stunting, this is in line with study conducted by Suraoka et al. (2011) on children aged 2-5 years in Denpasar who concluded that there was a significant difference in the average amount of energy and protein consumption per day in the normal children under five group and the stunted children under five group with a higher average energy and protein consumption for non-stunted children under five. Compared with stunted children (Suraoka et al., 2011).

The conclusion of this study is that nutritional intake is a risk factor for stunting and children under five with insufficient nutritional intake have a greater risk of experiencing stunting. Children under five in the work area of Community health center Kebondalem, Pematang Regency, having a low level of nutritional intake, have a risk of being 9.54 times greater for stunting. The suggestions that can be given, it is hoped that the family will be able to increase the nutritional intake of children under

five and pay attention to adequacy, especially food sources of nutrients that support the improvement of children under five growth and development.

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