



Environmental Factors Affecting Stunting Incidence In Siak Regency, Riau Province In 2024

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Abstract

The problem of stunting is still a serious problem because the rate is still high in Indonesia. Stunting in toddlers is the result of several factors, both direct and indirect. It is directly caused by insufficient food intake, and infectious diseases. Environmental problems are an indirect consequence of stunting, which is closely related to infectious diseases. This study aims to analyse environmental factors related to the incidence of stunting in toddlers in Siak Regency, Riau Province. This study is an analytical study with a cross sectional study approach, with a confidence level of 0.05. The population in this study is mothers who have toddlers aged 0-60 months with a sample of 312 respondents. The sampling technique in this study is the Purposive Sampling method. The analysis was carried out univariate, bivariate and multivariate which was analyzed using SPSS 29 software. Of the 8 environmental variables, 3 variables were found to be significantly related to the incidence of stunting, namely: between drinking water sources ($p = < 0.001$), house conditions ($p = 0.024$), and hand washing with soap ($p = 0.039$). Meanwhile, the type of toilet, the cleanliness of the house environment, the ventilation of the house, the condition of the walls and floors of the house, the treatment of drinking water before consumption, and the area of the building, with p-values of 0.878, 0.108, 0.224, 0.913, and 0.301, respectively, there was no relationship between the facilities and the incidence of stunting. In conclusion, there was a significant relationship with the incidence of stunting from the availability of drinking water sources, house conditions, and washing hands with soap affected the incidence of stunting.

Keywords: Stunting, Environment, Toddlers, Home, Drinking Water

1. Introduction

Stunting, or the condition of failure to grow in children under five due to chronic malnutrition, is a serious health problem in Indonesia. Based on data (UNICEF, 2020), The prevalence of stunting in Indonesia reaches 30.8%, which means that almost one in three children under five is stunted. Siak Regency in Riau Province is one of the areas that has a fairly high stunting prevalence rate. Environmental factors, which include access to clean water, sanitation, and environmental hygiene, play an important role in stunting prevention (Black et al., 2013), and (Kwami et al., 2019)

Research in India found that more than 50% of the population defecates in the open, and statistical tests show that poor environmental conditions contribute significantly to the high rate of stunting. Inadequate access to clean water, sanitation and hygiene facilities abbreviated as (WASH) is closely related to the growth and development of children (Cumming & Cairncross, 2016). Therefore, a holistic environmental approach is needed to overcome the stunting problem in Siak Regency.

Improving sanitation and access to clean water have proven effective in reducing stunting rates in various countries (Rah et al., 2020). However, in Siak Regency, there are still many households that do not have access to adequate sanitation facilities. This is a big challenge in stunting prevention efforts that must be overcome through an environmental approach.

Sanitation facilities in Siak Regency are still very limited. Data from BPS shows that only about 60% of households have access to healthy latrines. This means that there are still around 40% of households that do not have adequate sanitation facilities, which can increase the risk of spreading infectious diseases. These diseases can interfere with nutrient absorption in children and contribute to high stunting rates.

Another environmental factor that affects is access to health services. Siak Regency has limitations in the number of adequate health facilities. Data from the Siak Regency Health Office shows that the ratio of health workers to the number of population is still less than the standard set by the Coordinating

Minister for Health. This limitation causes a low level of preventive and curative health services, including in handling nutritional problems.

In addition, maternal education about the importance of hygiene and sanitation is also Key Factors in Stunting Prevention (Bhutta Z et al., 2008). Mother's knowledge of good hygiene practices can prevent the occurrence of infectious diseases that are often the cause of stunting. In Siak Regency, education and health counseling programs for mothers and families need to be improved. The purpose of this study is to find out the environmental conditions in Siak Regency that contribute to the prevalence of stunting in children under five.

Stunting is a condition in which children experience stunted growth due to chronic malnutrition, often occurring in the first 1,000 days of life. According to (WHO, 2015), Stunting is measured based on height to age that is less than minus two standard deviations from the median WHO child growth standard. This condition reflects chronic growth failure and has an impact on the child's cognitive and physical development.

WHO states that stunting is the result of various factors, such as maternal nutritional status during pregnancy, feeding practices in children, and recurrent infectious diseases. In addition, environmental factors such as access to clean water and sanitation also play an important role in the incidence of stunting.

In Indonesia, the prevalence of stunting is still high despite various intervention efforts that have been made. Based on Riskesdas 2018 data, the prevalence of stunting in children under five reached 30.8%. This shows the need for a more comprehensive and sustainable approach to reduce stunting rates (Kemenkes RI: Badan Penelitian dan Pengembangan Kesehatan, 2019).

According to (Prendergast & Humphrey, 2014) Stunting not only has an impact on children's physical health, but also on their cognitive development and learning capacity. Children who are stunted tend to have lower learning abilities, which can affect academic achievement and productivity in the future.

The main factors that cause stunting include chronic malnutrition, recurrent infectious diseases, and suboptimal feeding practices. (Black et al., 2013) identifying that the nutritional status of mothers during pregnancy greatly affects the incidence of stunting in children. Iron and folic acid deficiency in pregnant women can increase the risk of stunting in children born.

In addition, feeding practices that are not up to standard are also the main cause of stunting. According to research by (Arikpo et al., 2018), Exclusive breastfeeding during the first six months of life is essential to prevent stunting. After that, providing complementary foods that are rich in nutrients is also very necessary (Fernandez Rao et al., 2020).

Recurrent infections such as diarrhea and respiratory infections also contribute to stunting. Research by (Arini et al., 2020) shows that children who often experience diarrhea more often and longer will have a higher risk of stunting. These infections interfere with the absorption of nutrients and increase the body's energy needs to fight infections.

Environmental factors such as access to clean water and sanitation also play an important role in the incidence of stunting. (Cumming & Cairncross, 2016) stated that improved sanitation and access to clean water can reduce the risk of stunting by reducing exposure to pathogens that cause infections.

2. Method

Research Type, Location and Time

This research will be conducted in Siak Regency, Riau Province. The selection of Siak Regency as the location of the research is based on the efforts of the local government that is active in the stunting control program. The "Siak Hijau" program launched by the Siak Regency Government aims to improve the quality of the environment through various initiatives, including increasing access to sanitation and clean water, as well as health education to the community. This research is expected to provide useful evaluations and recommendations to strengthen the program. This research was carried out from July to August 2024.

Population and Sample

In this study, the population is all mothers who have children under five aged 0-60 months in Siak Regency, with a total population of 27,200 people spread across 14 sub-districts and 131 villages and 3 sub-districts.

The total sample taken was stunted and non-stunted toddlers, each with a comparison of 140 stunted and 172 non-stunted. The variables studied in this study include: stunted toddlers, the number of family members, the toilet used, the habit of washing hands with soap, the cleanliness of the home environment, the source of drinking water, the treatment of drinking water before consumption, the ventilation of the house, the condition of the house, the humidity from the walls and floors, and the area of the residential building.

Data Collection and Processing

The data from the research results were obtained by collecting primary data and secondary data. Primary data was obtained directly from respondents through measurement and filling out questionnaires using google forms. Meanwhile, secondary data is data obtained from related agencies, namely the Health Office, Food Crops Service, Agriculture Service, and Public Works Office.

Data Analysis

Data analysis is carried out in the form of: Univariate analysis, The first data analysis is

univariate analysis, then bivariate analysis, which is to find out or test the relationship between independent variables and dependent variables, and the last multivariate analysis.

3. Research Result

1. Univariate Analysis

Univariate analysis was carried out from each variable from the research results in the form of frequency distribution and percentage of each variable.

Table 1. Distribution of Respondents Based on Research Variables

Variable		Father		Mother	
		n	%	n	%
Age Group	20-30	74	23.7	127	40.7
	31-40	157	50.3	152	48.7
	>40	81	26.0	33	10.6
	Total	312	100.0	312	100.0
Education Level	No School	4	1.3	0	0
	Elementary School Graduation	64	20.4	51	16.4
	Graduated from junior high school	76	24.4	84	26.9
	Graduated from senior high school	131	42.0	146	46.8
	Graduate from Diploma/S1	37	11.9	31	9.9
	Total	312	100.0	312	100.0
Occupation	Not Working	4	1.3	278	89.1
	Farmer	88	28.2	3	1.0
	Laborer	59	18.9	1	0.3
	Honorary Teacher	11	3.5	11	3.5
	Self employed	100	32.1	4	1.3
	Private Employees	36	11.5	7	2.2
	Civil Servants	14	4.5	8	2.6
	Total	312	100.0	312	100.0

Based on table 1 of the distribution of respondents based on the age of the father, it is known that the most frequent age between the ages of 31-40 years is 50.3%, the same as the age of the mother, which is 40.7%. Meanwhile, the lowest age frequency of fathers is almost the same between 20-30 and >40, which is around 23.7% and 26.0%. The lowest maternal age was more at >40 by 10.6%.

The average education of fathers and mothers of the respondents was high school graduation, which was 42.0% and 46.8% respectively. For the lowest education, some fathers are illiterate while mothers

are not illiterate. There are 11.9% and 9.9% of parents who have graduated from Diploma/Bachelor's degree.

When looking at the occupation of fathers, the most is 32.1% and mothers are generally not working, which is 89.1%, while there are fathers who are not working, which is 1.3%. The other father's jobs were as farmers, labourer's, civil servants and private employees.

2. Bivariate Analysis

Table 2 Bivariate Analysis of Research Variables with Stunting Incidence

	Very Stunting		Stunting		Normal		Tall		%	P-value
	n	%	n	%	n	%	n	%		
Types of Toilets										
▪ Gooseneck with Septic Tank	52	16.8	76	24.6	177	57.3	4	1.3	100,0	0,152
▪ Ground sink toilet	0	0.0	1	33.3	2	66.7	2	0.0	100,0	
Washing hands with soap										
▪ Always	31	13.4	56	24.1	142	61.2	3	1.3	100.0	0,039
▪ Sometimes	21	26.2	21	26.2	37	46.3	1	1.2	100,0	
Home Environmental Cleanliness	39	17.8	48	21.9	129	58.9	3	1.4		

▪ Clean									100,0	0,039
▪ Clean Enough	11	13.4	27	32.9	44	53.7	0	0.0	100,0	
▪ Dirty	2	18.2	2	18.2	6	54.5	1	9.1	100,0	
<u>Drinking Water Sources</u>										< 0,001
▪ Well	17	17.5	28	28.9	51	52.6	1	1.0	100,0	
▪ Regional Drinking Water Company	2	66.7	1	33.3	0	0.0	0	0.0	100,0	
▪ Rainwater	1	33.3	0	0.0	1	33.3	1	33.3	100,0	
▪ Gallon Water	32	15.3	48	23.0	127	60.7	2	1.0	100,0	
<u>Home Ventilation</u>										0,224
▪ Good	34	15.5	50	22.7	134	60.9	2	0.9	100,0	
▪ Enough	13	17.3	23	30.7	38	50.7	1	1.3	100,0	
▪ Less	5	29.4	4	23.5	7	41.2	1	5.9	100,0	
<u>House Condition</u>										0,024
▪ Good	35	16.1	46	21.2	135	62.2	1	0.5	100,0	
▪ Enough	12	15.0	27	33.7	38	47.5	3	3.8	100,0	
▪ Less	5	33.3	4	26.7	6	40.0	0	0.0	100,0	
<u>Condition of the Walls and Floor of the House</u>										0,730
▪ No Moisture	41	15.7	66	25.4	150	57.7	3	1.2	100,0	
▪ Quite Moist	11	21.2	11	21.2	29	55.7	1	1.9	100,0	

There was a relationship between hand washing with soap and stunting incidence $p = 0.039$). Children who are stunted and highly stunted have a higher percentage of their families sometimes washing their hands with soap (52.6%) compared to those who always wash their hands, which is 37.5%. Drinking water sources were found to be very significant in terms of stunting and influencing $p = < 0.001$). Households whose drinking water sources from PDAM all suffer from stunting, namely 3 people (100%) compared to their drinking water sources from gallons of water, rainwater and from wells.

It was also found that house conditions significantly affected stunted children ($p=0.024$). Families who have houses with less condition, are more stunted and highly stunted almost 2 times than families with good house conditions, which is 60%, while families with good house conditions are only 37.3% stunted.

Poor physical quality of drinking water was higher in children who were stunted (84.2%) than those who were not stunted (15.8%). There was a relationship between latrine ownership and stunting incidence ($p=0.001$). Households that do not have latrine facilities are higher in children who are stunted (83.3%) than those who are not stunted (16.7%).

There was no significant relationship between the type of toilet used ($p=0.024$), the cleanliness of the home environment ($p=0.024$), the treatment of drinking water before consumption ($p=0.913$), and the ventilation of the house $p=0.224$. However, when viewed in terms of the percentage of stunted children, it is higher in the toilet with the soil, lack of ventilation, and in houses with damp walls and floors.

4. Discussion

Hand washing habits and stunting

This study found that hand washing habits are significantly related to the prevalence of stunting among children. Children who lived in families that did not wash their hands regularly with soap showed a higher percentage of stunting (52.6%) compared to those who regularly washed their hands (37.5%) with a value of $p = 0.039$. These findings are in line with research conducted by (Curtis & Cairncross, 2003) and (Woldesenbet et al., 2023) which stated that poor sanitation and inadequate hygiene, including hand washing, can degrade children's nutritional conditions and contribute to stunting.

Drinking Water Sources and Stunting

The findings of the study showing a very significant correlation between drinking water sources and stunting ($p < 0.001$) support previous evidence that drinking water quality affects nutritional status. In this study, all children from households that use PDAM water experienced stunting. This is the opposite of the situation of children who use alternative water sources such as gallons of water, rainwater, or wells. A study by (Bain et al., 2014) indicates that access to safe drinking water can significantly reduce the risk of nutritional problems in children, including stunting.

Housing Conditions and Stunting

Housing conditions also had a significant effect on the incidence of stunting ($p = 0.024$). Families with worse house conditions have almost twice the prevalence of stunting compared to families with good house conditions (60% compared to 37.3%). This confirms the findings from (WHO, 2020) which highlights the importance of the housing environment in supporting children's health and nutrition.

Other Variables

The study also found that several other factors such as toilet type, home environmental cleanliness, drinking water treatment, and home ventilation did not have a significant relationship with stunting, although in general, less hygienic conditions (such as toilets with soil, damp houses) were associated with a higher percentage of stunting. This suggests that some environmental factors have a greater role than others in the context of stunting, which requires further investigation to understand the interactions between the variables.

5. Conclusion and Sugestion

This study confirms that environmental factors play a significant role in stunting incidence among children. The main findings suggest that hygienic practices, particularly washing hands with soap, are closely related to the prevalence of stunting, with children from families who wash their hands less regularly more likely to experience stunting. Furthermore, poor drinking water sources, inadequate housing conditions, and lack of sanitation facilities such as latrines, all contribute significantly to the high rate of stunting. The study also highlights that although some other environmental variables such as toilet type, drinking water treatment, and home ventilation do not show a significant relationship, they still have the potential to have a negative impact on stunting conditions if associated with other factors in a broader context.

In the context of policies and interventions, these findings suggest the need for a multisectoral strategy that includes improving access to adequate sanitation facilities, providing clean water, and improving housing conditions. Intervention programs that prioritize improving hygiene practices among families with children, especially in handwashing, can be an effective focal point to reduce stunting. Furthermore, coordination between the health, infrastructure, and education sectors needs to be improved to form a holistic approach in addressing nutrition and child health problems, especially stunting.

Overall, addressing the problem of stunting requires a deep understanding of the complexity of the interaction between various environmental and behavioral factors. By understanding these relationships, more targeted and effective interventions can be designed to reduce stunting prevalence and improve long-term health outcomes for children in Indonesia and around the world.

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