

## ***THE RELATIONSHIP OF NUTRITION AND SANITATION TO THE EVENT OF STUNTING IN CHILDREN UNDER FIVE IN BOGOR DISTRICT***

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### ***ABSTRACT***

*The national strategy for accelerating the reduction of stunting in Indonesia reaches 14% in 2024. One of the provinces with stunting prevalence exceeding the national figure is West Java Province (31%). Stunting toddlers experience failure to thrive when their height is less than their age standard. Nutrition and sanitation factors are key indicators as essential criteria that must be achieved at the family level to prevent stunting. This study aimed to examine the relationship between nutrition and sanitation aspects on the incidence of stunting in children under five in Bogor District. The study used a cross-sectional study on 100 children aged 0-59 months living in the Bogor district selected by proportional random sampling technique. Stunting was measured using an anthropometric index (body length/height according to age. Measurement of nutrition and sanitation aspects included: 1) Nutrition indicators, namely balanced nutrition practices, quantitative food intake (food frequency questionnaire), 2) sanitation indicators, including personal hygiene practices and availability sanitation facilities. Sociodemographic characteristics were measured using a structured questionnaire. Data were analyzed univariately and bivariate using SPSS version 22.0. The results showed that practicing balanced nutrition was related to stunting in children under five ( $p = 0.046$ ). Meanwhile, carbohydrate intake, protein intake, and sanitation were not associated with stunting ( $p > 0.05$ ). Health promotion related to the four principles of balanced nutrition for mothers of children under five is expected to reduce the prevalence of stunting.*

**Keywords:** *Stunting, nutritional intake, sanitation, children under five*

### **INTRODUCTION**

The convergence of the acceleration of stunting prevention is carried out through a multi-sectoral approach. This effort aims to achieve the national strategy of accelerating stunting reduction in Indonesia by 14% in 2024. However, the decline in stunting prevalence has only reached 6.4% over 5 years, from 37.3% (2013) to 30.8% (2018).<sup>1</sup> Stunting children under five experience growth failure due to chronic malnutrition, characterized by height that is not appropriate for their age.<sup>2</sup> Stunting children under five are at risk of experiencing physical and cognitive disorders, metabolic disorders that cause degenerative diseases, and socio-emotional development disorders,<sup>3-5</sup> thereby increasing the economic burden for the state, society, and family.<sup>1,2</sup>

Prevention of stunting is carried out through the integration of specific and sensitive nutrition interventions.<sup>6,7</sup> Specific nutrition interventions related to nutritional problems: 1) fulfillment of food intake, 2) parenting patterns and 3) disease/infection conditions. Sensitive nutrition interventions cover

the non-nutrition sector: 1) access to nutritious food, 2) nutrition and health services, and 3) sanitation. Family-based nutrition and sanitation factor interventions can significantly prevent stunting.<sup>8-10</sup>

Various models for predicting the occurrence of stunting show the strong influence of nutrition and sanitation on stunting.<sup>11,12</sup> However, the Measurement of these two factors is still limited. Sushmita et al. (2020) measure nutritional indicators but are limited to qualitative assessments.<sup>13</sup> While Das et al. (2017) measure sanitation indicators by assessing the availability of sanitation facilities.<sup>14</sup>

Massive stunting prevention programs are carried out globally. WHO recommends a nutrition-friendly school program (Nutrition-Friendly Schools Initiative), establishing nutrition and sanitation indicators in schools as essential criteria for assessing child growth, which can be reduced to programs at the family level.<sup>15</sup> Another program, 'Nutrition Awareness Families' (Kadarzi), also focuses on nutritional aspects.<sup>16</sup>

Problems studied: The prevalence of stunting under five is still high and far from the achievement target. Efforts to prevent stunting have not been comprehensively based on nutrition, and sanitation factors have not been carried out optimally. In addition, monitoring the growth of children under five in a cohort and family-based nutrition and sanitation interventions are also not optimal.

The specific purpose of this study was to obtain information on the incidence of stunting based on the anthropometric index of Height/Age to assess malnutrition, as well as factors causing stunting, including 1) nutritional indicators (balanced nutrition practice, quantitative food intake (food frequency questionnaire), 2) sanitation indicators (personal hygiene and availability of sanitation facilities).

## **METHOD**

The research design used is a cross-sectional study design. This design measures the variables studied at one time in the population. This research was conducted in Karang Tengah village, Bogor district, in June-July 2022. The study's target population was children under five with a sample of 100 childrens selected by proportional random sampling technique. Stunting was measured using an anthropometric index (body length/height according to age. Measurement of nutrition and sanitation aspects included: 1) Nutrition indicators, namely balanced nutrition practices, qualitative food intake (food frequency questionnaire), 2) sanitation indicators, including personal hygiene practices and availability sanitation facilities. Sociodemographic characteristics were measured using a structured questionnaire.

This research has been carried out by the research ethics of the Faculty of Medicine and Health Universitas Muhammadiyah Jakarta with letter number 115/PE/KE/FKK-UMJ/VI/2022. The main researcher carried out data collection and was assisted by enumerators (students of the Faculty of Medicine and Health Universitas Muhammadiyah Jakarta). In this study, the author confirms that all methods follow the relevant guidelines and regulations (Helsinki Declaration). This research is not experimental or intervention research.

All data in the questionnaire were checked and then coded and inputted using SPSS version 22.0. Descriptive statistics consisting of percentages and categories were analyzed by univariate analysis. 95% confidence level and P-value <0.05 were used to assess statistical significance. Using the chi-square test, the relationship of nutrition and sanitation to the event of stunting.

## RESULTS AND DISCUSSION

Table 1 shows that 16.0% of children under five suffer from stunting. Lower than the results of the Indonesian Nutrition Status Study (SSGI) survey in 2021 by 24.4%.<sup>17</sup> Only 1% of children under five practice the principles of balanced nutrition, 94% do not practice one of them, and the other 5% do not practice it at all. Most children under five have adequate carbohydrate and protein intake. Family sanitation shows that most families do water treatment.<sup>18</sup> Some families use dug wells for cooking and refilling gallons of drinking water.<sup>18</sup> The distance between the water source and the toilet is almost the same, between <10 meters and 10 meters. Most families have a defecation habit in the toilet.

**Table 1. Children Under Five Characteristics**

Variable	N	%
<b>Age</b>		
< 24 Month	50	50.0
≥ 24 Month	50	50.0
<b>Sex</b>		
Boy	50	50.0
Girl	50	50.0
<b>Nutrition status</b>		
Stunting	16	16.0
Normal	84	84.0
<b>Balanced nutrition practice</b>		
Not do	5	5.0
Do less	94	94.0
Yes do	1	1.0
<b>Carbohydrate intake</b>		
< 3x/day	14	14.0
≥ 3x/day	86	86.0
<b>Protein intake</b>		
< 3x/day	13	13.0
≥ 3x/day	87	87.0
<b>Water treatment</b>		
No	33	33.0
Yes	67	67.0
<b>Cooking water source</b>		
Tap water	1	1.0
Pumps well	27	27.0
Dug well	52	52.0

Variable	N	%
Mountain springs	5	5.0
River/lake/irrigation	1	1.0
Refill gallon water	14	14.0
<b>Drinking water source</b>		
Pumps well	15	15.0
Dug well	27	27.0
Mountain springs	5	5.0
Refill gallon water	53	53.0
<b>Distance of toilet from a water source</b>		
<10 meter	48	48.0
≥10 meter	52	52.0
<b>Defecation Habit</b>		
Public toilet	2	2.0
Private toilet	93	93.0
Open place (garden, river, pool)	5	5.0

Table 2 shows that practicing balanced nutrition is associated with stunting in children under five. Setia et al. research (2022) state that balanced nutrition affects the restoration of the nutritional status of stunted children.<sup>19</sup> Children under five characteristics such as carbohydrate and protein intake and sanitation were not associated with stunting in children under five. This differs from previous studies, which stated that carbohydrate and protein intake were associated with stunting in children under five.<sup>20</sup> Different results can be caused by different ways of categorizing intake frequency. Previous studies categorized the frequency of carbohydrate and protein intake based on the median. A recent cluster-randomized trial in Bangladesh found no water, sanitation, and hand washing effect on children's linear growth.<sup>21</sup> Research by Rah et al. 2020 shows that there is no synergistic effect of household sanitation and clean water supply on stunting in Indonesian children under five.<sup>22</sup>

**Table 2. The Relationship of Nutrition and Sanitation to The Event of Stunting in Children Under Five**

Variable	Stunting		Normal		P-value
	N	%	N	%	
<b>Balanced nutrition practice</b>					
Not do	0	0.0	5	100.0	<b>0.045*</b>
Do less	15	16.0	79	84.0	
Yes do	1	100.0	0	0.0	
<b>Carbohydrate intake</b>					
< 3x/day	2	14.3	12	85.7	1.000
≥ 3x/day	14	16.3	72	83.7	
<b>Protein intake</b>					
< 3x/day	0	0.0	13	100.0	0.121
≥ 3x/day	16	18.4	71	81.6	
<b>Water treatment</b>					
No	7	21.2	26	78.8	0.479
Yes	9	13.4	58	86.6	

Variable	Stunting		Normal		P-value
	N	%	N	%	
<b>Cooking water source</b>					
Non dug well	10	20.8	38	79.2	0.320
Dug well	6	11.5	46	88.5	
<b>Drinking water source</b>					
Non-refill gallon water	6	12.8	41	87.2	0.577
Refill gallon water	10	18.9	43	81.1	
<b>Distance of toilet from a water source</b>					
<10 meter	6	12.5	42	87.5	0.519
≥10 meter	10	19.2	42	80.8	
<b>Defecation Habit</b>					
Rivers and others	0	0.0	5	100.0	1.000
Toilet	16	16.8	79	83.2	

\**significant* (<0.05)

## CONCLUSION AND SUGGESTIONS

Health promotion related to the 4 principles of balanced nutrition for mothers of the children under five is expected to reduce the prevalence of stunting. Prevention efforts are needed through nutrition education for Posyandu (integrated health service post) cadres as health promotion agents who can directly interact with family and community, so it effectively reduces stunting prevalence.

## ACKNOWLEDGMENT

We extend our highest appreciation and gratitude to all research respondents. We also thank the data collectors and supervisors for their outstanding contributions. We would like to thank the Universitas Muhammadiyah Jakarta, LLDIKTI Region III, Directorate of Research, Technology, and Community Service, Directorate General of Higher Education, Research, and Technology, Ministry of Education, Culture, Research, and Technology (Kemdikbudristek) Republic Indonesia have funding and supported implementation of Penelitian Dasar Unggulan Perguruan Tinggi (PDUPT) on the year 2022 with contract number 155/E5/PG.02.00.PT/2022.

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