

**THE RELATIONSHIP OF ENVIRONMENTAL FACTORS AND A HISTORY OF
DIARRHEA TO THE INCIDENCE OF STUNTING
IN BADUTA AGED 6-23 MONTHS**

(Study in the Working Area of Puskesmas Ciawi Tasikmalaya Regency)

Siti Novianti¹, Agus Nurjaman²

^{1,2} Public Health Study Program, Faculty of Health Sciences,
Siliwangi University, Tasikmalaya, Indonesia
email: sitinovianti@unsil.ac.id

Abstract

Stunting is a short or very short state that is based on height according to age. Factors that influence the occurrence of stunting consist of direct factors, indirect factors, and the root of the problem. Environmental factors are indirect factors for the incidence of stunting, where a history of infectious diseases is a link between environmental factors and stunting events. The purpose of this study is to determine the relationship between environmental factors and a history of diarrheal disease to the incidence of stunting in baduta aged 6-23 months in 2021 in the work area of the Ciawi Health Center, Tasikmalaya Regency. The research method used is a quantitative method with a case-control research design. The sample in this study was 102 Badura mothers consisting of 51 stunted baduta mothers and 51 non-stunted baduta mothers. The statistical test used is Chi-Square with (α) = 0.05. The results of the study found that there was a relationship between a history of diarrhea (p-value = 0.031, OR = 5.976), access to sanitation (p-value = 0.034, OR = 4.02) and access to drinking water (p-value = 0.006, OR = 4.453) with stunting events. Meanwhile, there is no relationship between access to sanitation (p-value = .1,000) and access to drinking water (p-value = 0.482) with a history of diarrhea. The conclusion of this study is that the variables associated with stunting events are a history of diarrhea, access to sanitation, and access to drinking water. Meanwhile, access to sanitation and access to drinking water is not related to a history of diarrhea. It is hoped that households can improve sewage channels so that access to sanitation is safe and drinking water sources are safe for consumption.

Keywords: Stunting; Baduta; History of Diarrhea; Sanitation; Drinking Water

1. INTRODUCTION

Stunting is one of the problems that hinder development globally. According to the Ministry of Health of the Republic of Indonesia (2019), that stunting is a short or very short state based on height according to age. Data from the Ministry of Health in 2019 Indonesia has a significant change in prevalence from 2014-2018, namely 28.9% (2014), 29% (2015), 27.5% (2016), 29.6% (2017) and 30.8% (2018). From this data, toddlers aged 0-23 months had a stunting prevalence in 2018 of 29.9%; the data has increased from the previous year (2017), which was 20.1% (Ministry of Health, 2019).

Tasikmalaya Regency still occupies five regions with the highest prevalence of stunting events in West Java Province, with an annual prevalence of 15% (2017), 33.3% (2018), and 14.9% (2019). One of the sub-districts in Tasikmalaya Regency is Ciawi District. Data from the Tasikmalaya Regency Health Office stated that the prevalence of stunting events in the Ciawi Puskesmas area increased from 2018 by 13.7% to 2019 by 20.7%, so that of the 11 villages in Ciawi District, six villages were the locus areas (focus locations) of stunting interventions. From the data above, in both Indonesia, West Java Province, Tasikmalaya Regency, and in the Ciawi Health Center Area, the incidence of stunting still exceeds the maximum prevalence limit determined by WHO, which is 20%. So there is a need for countermeasures to reduce the incidence of stunting.

The environment is an indirect factor in the incidence of stunting. The environmental factors in question are improper sanitation, Access to drinking water, waste handling, and disease vectors. If there is an imbalance in these factors, it can cause infection events such as diarrhea (1). This diarrheal disease can interfere with the absorption of nutrients in the digestive process, causing the baby to lose weight. If this condition occurs for a long period of time and is not accompanied by adequate intake for the healing process, it can result in stunting (2)(3). Qantas research shows there is a relationship between the availability of healthy latrines and the ownership of SPAL to the nutritional status of baduta (4,5)(6). Results of the literature review (7) also revealed that water and sanitation are factors related to stunting in toddlers in Indonesia.

Based on a preliminary survey conducted on ten respondents who had stunting baduta in the Ciawi Health Center Working Area, Tasikmalaya Regency, it was found that as many as seven baduta (70%) had experienced a history of diarrhea in successive times in the last two months. Then 8 out of 10 respondents (80%) had poor access to sanitation with indicators of latrine ownership, type of latrine, and type of toilet; for the results of a survey of access to drinking water, 7 out of 10 respondents (70%) did not have access to proper drinking water with indicators of drinking water sources, a distance of drinking

water sources to dumps, places of drinking water facilities and water supply.

2. METHODS

The research carried out is quantitative research, with an observational design precisely like the design of control case research. The research was carried out in the working area of the Ciawi Health Center, Tasikmalaya Regency. The population taken was 1,031. The determination of the sample amount was calculated using the Epi info version 7 application, which produced a sample of 102 respondents, consisting of 51 cases (stunting) and 51 controls (not stunting). Identification of nutritional status, namely stunting and non-stunting, based on Posyandu data from the measurement results of the last month before the implementation of the study. Access to safe sanitation is if the household has its own latrine, a swan neck shape toilet, and septic tanks as a sewer. Meanwhile, access to safe drinking water is if the household has a decent source of

drinking water, the distance of the drinking water source to the waste/manure reservoir is less than 10 meters, the location of drinking water facilities in the house, and, the time required to get water is less than 30 minutes and the water supply in 24 hours within a period of 1 year is always available. The history of diarrhea is measured based on the history of diarrhea events in the last two months diagnosed by health workers. The sampling technique taken is purposive sampling. Sorting of samples based on predetermined criteria. Analysis of research data was carried out by univariate analysis and bivariate analysis. Relationship test analysis using Chi-Square because the type of data obtained is in the form of categories.

3. RESULTS AND DISCUSSION

1. Characteristics of Research Respondents

The characteristics of the research respondents can be seen as follows:

Table 1
Characteristics of Respondents

No	Variable	Case		Control	
		n	%	n	%
Recent Education					
1	Finished Elementary School	17	33,3	17	33,3
2	Graduated from junior high school	24	47,1	16	31,4
3	Finished High School	9	17,6	17	33,3
4	Graduated from D3/Bachelor's Degree	1	2	1	2
Work					
1	Not Working	51	100	49	96,1
2	Self-employed	0	0	1	2
3	Civil Servants	0	0	1	2
Income					
1	> District Minimum Wage	36	70.6	33	64.7
2	<= District Minimum Wage	15	29.4	17	33.3
3	Unknown	0	0	1	2
Sum		51	100	51	100
Age of Respondents					
	Mean	28,8		29,98	
	Median	28		29	
	Standard Deviation	6,481		6,15	
	Min	18		19	
	Max	43		44	

From the table above, it is known that the last education that was the most was junior high school (SMP) graduates, namely 24 people (47.1%) in case groups, 16 people (31.4%) in control groups, and elementary schools (SD) namely 17 case respondents and 17 control respondents (33.3%). It can also be seen that the last least educated respondents were D3 graduates/undergraduates, namely 1 case respondent and one control respondent (2%). Most respondents were not working, and in this case, the respondents were housewives, namely 51 case respondents (100%) and 49 control

respondents (96.1%); then, only one control respondent (2%) worked as self-employed and one control respondent who worked as a civil servant (2%).

2. The Relationship Between Access to Sanitation and the Incidence of Diarrhea in Baduta Aged 6-23 Months

The following is the result of the analysis of access to sanitation and the incidence of diarrhea in Baduta aged 6-23 months, as shown in table 2 below:

Table 2

The Relationship Between Sanitation Access and History of Diarrhea in Baduta Aged 6-23 Months in the Working Area of the Ciawi Health Center, Tasikmalaya Regency in 2021

Sanitation Access	History of Dare				<i>p-value</i>
	Yes		No		
	n	%	N	%	
Insecure access	10	11.8	75	88.2	1.000
Secure access	2	2	15	88.2	
Total	12	11.7	90	88.2	

Based on table 2, it is known that the results of statistical tests using Chi-square are *p* values greater than 0.05 (1,000), which states that there is no relationship between access to sanitation and a history of diarrhea. When viewed from the observation data, there are still a number of people who state that they have no difficulty in obtaining clean water. But this is not enough if it is not accompanied by the availability of facilities that are in accordance with health requirements.

This is in line with the research (8) that there is no relationship between access to sanitation in the form of latrine ownership and a history of diarrhea *p*-value of 0.149. In this study, Arimbawa et al. categorized latrines into two, namely unhealthy latrines and healthy latrines. An unhealthy latrine is defined as not having a family latrine or having a latrine without a septic tank (feces are

channeled into the river); a healthy latrine is defined as a family latrine equipped with a septic tank (gooseneck latrine), and the results of the study showed that 7.1% of respondents did not have a healthy latrine, and 100% of baduta had diarrhea. Respondents who have used healthy latrines are 92.9%, of which 58.5% of toddlers have diarrhea. In line with research conducted by Kurniwati and Silmi (2021), there is no relationship between access to sanitation in the form of healthy latrines and the incidence of diarrhea in toddlers. Meanwhile, in the research of Kasman and Isaac, different results were found, where there was a relationship between the ownership of latrines and the incidence of diarrhea (9).

3. The Relationship Between Access to Drinking Water and a History of Diarrhea at Baduta Aged 6-23 Months

Table 3

The Relationship Between Access to Drinking Water and a History of Diarrhea in Baduta Aged 6-23 Months in the Ciawi Health Center Work Area in 2021

Access to Drinking Water	History of Dare				<i>P-Value</i>
	Yes	No			
	N	%	N	%	
- Insecure access	8	10.4	69	89.6	0,482
- Secure access	4	12.8	21	84	
Total	12	11.8	90	88.2	

Based on table 3, it is known that the results of statistical tests using Chi-square are p values greater than 0.05 (0.482), which states that there is no relationship between access to drinking water and a history of diarrhea. Some people still complain about water quality, and people still feel that the quality of water is cloudy, smelly, and colored, which can determine the presence of e.coli in the water consumed. According to Permenkes no. 492 of 2010 concerning drinking water, stating the physical requirements of drinking water can be seen from turbidity, smell, and color, where the quality of bad water will cause many germs of diseases, especially infectious diarrhea (10)(11).

This research is in line with the research conducted by (12) that there is no relationship between access to drinking water, in this case, the source of

drinking water, and the incidence of diarrhea p value 0.720 ($p > 0.05$). The resulting data, namely the utilization of drinking water sources, only 18 people (25.72%) of respondents with diarrhea incidence in toddlers who use drinking water sources are not eligible, and most of them, namely 52 people (74.28%), have met the requirements. This is because respondents ensure that first until it boils, the water that has been boiled to boil will kill the microorganisms in the water so that it does not cause disease. Different results were found in a study at the Kotakulon Bondowoso Health Center, which stated that drinking water sources and latrine ownership were not risked factors for stunting (13).

4. The Relationship Between Diarrhea History and Stunting Incidence in Baduta Aged 6-23 Months

Table 4
The Relationship Between Diarrhea History and Stunting Incidence in Baduta Aged 6-23 Months in the Ciawi Health Center Work Area in 2021

History of Diarrhea	Stunting Events				p-value	OR	CI
	Yes		No				
	n	%	n	%			
- Diarrhea	10	63.3	2	16.7	0,031	5,976	1,238-28,833
- No Diarrhea	41	45.6	49	44.4			
Total	51	50	51	50			

Based on table 4, it is known that the results of statistical tests using Chi-square are p values smaller than 0.05 (0.031), which states that there is a relationship between the history of diarrhea and the incidence of stunting OR = 5,976. This is evidenced by the percentage of respondents who had a history of diarrhea with a higher stunting case group compared to the control group. Judging from the position of the Ciawi Subdistrict area, which is in the countryside, but like the urban area, which is characterized by facilities that resemble urban areas and a high density of areas, it will facilitate the history of diarrhea transmitted either from person to person or from the environment to person.

The direct causes of stunting are infections and lack of nutritional intake. (14). Among the causes of infection as a risk factor for stunting in this study was a history of diarrhea. But not only that, the results of research on baduta in Merauke district (15) show that in addition to diarrhea, a history of ARI and malaria is also associated with the incidence of diarrhea in baduta.

This is also in line with the research conducted by (16), which stated that there was a relationship between the history of diarrhea and the incidence of stunting in toddlers aged 24-60 months, where toddlers who had a history of diarrhea were 4,173 times at risk of stunting. The results of the literature review (17) and also other studies (18) found a history of diarrhea infection with stunting in toddlers. In addition, other studies on diarrhea are related to the frequency and duration of diarrhea. Although the frequency of diarrhea is not significantly related, the duration of diarrhea increases the risk of stunting by five times (19).

A number of studies have reported that the incidence of diarrhea is higher in children with less nutritional status compared to good nutritional status. This is slightly different from Inayah's research (20) which found no significant association between diarrhea and stunting incidence.

5. Relationship between access to sanitation and the incidence of stunting in baduta aged 6-23 months

Table 5

The Relationship Between Access to Sanitation and stunting incidence in baduta aged 6-23 months in the Ciawi Health Center Work Area in 2021

Sanitation Access	Stunting events				<i>p-value</i>	OR	CI
	Yes		No				
	n	%	n	%			
- Insecure access	47	55.3	38	44.5	0,034	4.020	1.211-13.339
- Secure access	4	23.5	13	76.5			
Total	51	50	51	50			

Based on table 5, it is known that the results of statistical tests using Chi-square are *p* values smaller than 0.05 (0.034), which states that there is a relationship between access to sanitation and the incidence of stunting OR = 4.02. Most of the respondents who did not have access to safe sanitation were in the case group. The type of latrine that many people have is in the shape of a swan neck. This is in line with the results of the study (21) that society in general already has a swan neck toilet. However, the criteria for a healthy latrine are not only the shape of the gooseneck toilet but also the distance between the latrine and the source of clean water and adequate disposal facilities. If the latrine used does not meet the health requirements, it is prone to infectious diseases such as helminthiasis and diarrhea. If a person is exposed to

infectious diseases for a very long time, especially children, they will be at risk of stunting.

In line with the research conducted by Kusmawati et al. (2015), who examined the model of controlling stunting risk factors in children under three years of age, it was found that there was a relationship between access to sanitation and the incidence of stunting *p* value 0.000 where OR 8.28, where children with poor sanitation / unqualified 8.28 times would experience stunting. Research at the Cicalengka Health Center explained that the better the condition of the latrine, the more it will reduce the risk of stunting (22).

6. The relationship between access to drinking water and stunting incidence in baduta aged 6-23 months

Table 6
The Relationship Between Access to Drinking Water and Stunting In The Working Area Of Puskesmas Ciawi In 2021

Access to drinking water	Stunting Events				<i>p-value</i>	OR	CI
	Yes		No				
	n	%	n	%			
- Insecure access	45	58.4	32	41.6	0,006	4,453	1.600-12.394
- Akses aman	6	24	19	76			
Total	51	50	51	50			

Based on table 6, it is known that the results of statistical tests using Chi-square are p values smaller than 0.05 (0.006), which states that there is a relationship between access to drinking water and the incidence of stunting OR = 4,453. This is evidenced by the percentage of respondents whose access to unsafe or unqualified drinking water was higher in both the case group and the control group. From the results of interviews and observations, the community has used a type of protected drinking water source (93.14%), but judging from the distance of the drinking water source with the waste reservoir, feces or feces, there are still many who are less than 10 meters (45.1%), it will be pollution from the reservoir to the water source so that there will be infectious diseases due to the pollution. The occurrence of infectious diseases will cause stunting events.

This is in accordance with the research conducted by the study (23) with the result that there is a relationship between access to drinking water in the form of drinking

water sources and the incidence of stunting in toddlers aged 24-59 months in Sumatra.

4. CONCLUSIONS

The conclusion in this study is that the variables associated with stunting events are a history of diarrhea, access to sanitation, and access to drinking water. Meanwhile, access to sanitation and access to drinking water is not related to a history of diarrhea. It is hoped that households can improve sewage channels so that access to sanitation is safe and drinking water sources are safe for consumption.

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