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Original Research

SANITATION AND FAMILY ENVIRONMENTAL HEALTH STATUS AND ITS ASSOCIATION WITH STUNTING IN KULON PROGO, INDONESIA

Status Kesehatan Lingkungan, Sanitasi, dan Hubungannya dengan Balita Stunting di Kabupaten Kulon Progo, Indonesia

Maria Theodora Natalia Hurint[1], Hendras Bintari[1], Yuliani[1], Yulinda Kurniasari[2], Herwinda Kusuma Rahayu[2], Arif Sabta Aji[1,2,*]

[1]Departement of Nutrition Sciences, Faculty of Health Sciences, Alma Ata University, Yogyakarta, Indonesia
[2]Alma Ata Graduate School of Public Health, Faculty of Health Sciences, Alma Ata University, Yogyakarta, Indonesia

* Email corresponding author: Arif Sabta Aji, sabtaaji@almaata.ac.id.

Abstract: *Stunting remains prevalent in Indonesia. The indicators of the family's health were related with an unhealthy sanitation cause affect health and nutritional problems. This risk factor can affect the family to have stunting children.* ***Objectives:*** *The aim of this study was to analyze the relationship of family environmental sanitation status with stunting status in Kulon Progo.* ***Methods:*** *The Case-control study was conducted in 240 children with 80 cases (stunting) and 160 control (not stunting) groups, respectively. The subjects were 6-59 months and taken by purposive sampling technique in the public health center of Temon 2 in Kulon Progo, Indonesia. Stunting was assessed by z-score height for age which analyzed by WHO Anthro. Structured questionnaires were created to assess anthropometry, characteristics, and sanitation status in the household. A Chi-square test was used to analyze the data.* ***Results:*** *There was a relationship between family environment sanitation status and the incidence of stunting among subjects (p = 0.046; OR = 1.7; 95% CI = 1.01-2.99). Clean water availability in the households associated with the high risk of the children had stunting status (p = 0.012; OR = 2.1; 95% CI = 1.20-3.62). However, the other sanitation facilities such as a healthy latrine, trash can, and sewerage system had no association with the stunting risk in the household (p>0.05).* ***Conclusion:*** *This study found that if the families had not met the requirement of having clean water availability, they would have two times increase the risk of their children has stunting status.*

Keywords: Stunting, Sanitation, Clean Water, Family, Children

1. INTRODUCTION

Children are the next generation of the nation, healthy children are children who grow and develop well so that they are the next generation of quality for the nation in the future(1). Indonesia is currently still faced with quite serious nutritional problems such as failure to thrive, low birth weight, short height and a thin looking body which will then have an impact on malnutrition which in turn will lead to cognitive obstacles and failure in education and low productivity. Therefore, in order to accelerate the nutrition improvement program, the government is focusing its acceleration program on the First 1000 Days of Life (1000 HPK) program contained in Presidential Regulation number 42 of 2013 where nutritional intake during pregnancy will determine the growth and development of the fetus during pregnancy(2–5).

The incidence of stunting in toddlers is a major nutritional problem in Indonesia. According to the results of the 2018 Basic Health Research, stunting in Indonesia has decreased, namely the proportion of stunted toddlers due to a decrease in cases of chronic malnutrition from 37.2% to 30.8% in 2018. Based on information from Riskesdas 2013, Stunting in Indonesia is declining in the proportion of stunted children due to the decline in cases of chronic malnutrition from 37.2% to 30.8% in 2018. Meanwhile, based on the results of the 2018 Yogyakarta Health Department's Nutrition section report, stunting in 2017 was 28.1% and decreased to 12.37% in 2018. In Kulon Progo itself, based on the results of the 2018 report, the stunting rate reached 14.31%, while in 2019 the stunting rate fell to 13.62%. For the Temon 2 Community Health Center itself, the prevalence of stunting in 2018 was 12.97% and in 2019 it decreased to 11.42%(6).

The problem of stunting in toddlers is a serious problem(7). Chronic cases of stunting will affect cognitive function or low levels of intelligence which will result in low quality of human resources. Serious impacts resulting from stunting problems, both short, medium and long term, include morbidity and mortality in infants and toddlers which are short-term impacts, intellectual problems and low cognitive abilities which are medium-term impacts, and problems with the quality of human resources. and degenerative diseases which are the long-term impact of the stunting problem. Many factors cause stunting in babies under five and these factors are interconnected with each other(8). Factors that cause stunting according to UNICEF in 1998 include problems with nutritional intake, infectious diseases, household food availability, parenting patterns, health services and the environment. The process of stunting begins before pregnancy, where an anemic teenage girl then becomes an anemic mother who then becomes pregnant and during her pregnancy is also anemic and lacks nutritional intake(9).

The household environment with inadequate sanitation status is also related to stunting in toddlers(10). Achieving access to adequate sanitation and environmental cleanliness is the number two international target and output in one of the health sectors of the Sustainable Development Goals (SDGs) in 2030 in reducing stunting rates(11). Based on data from the Indonesian Ministry of Health in 2018, it was recorded that only 69.27% of the Indonesian population had adequate sanitation facilities. This means that more than 100 million Indonesians still have inadequate sanitation facilities. The current low level of family access to sanitation facilities has resulted in the emergence of environmental-based diseases which are the main cause of death in Indonesia, especially in infants and toddlers, such as infectious diseases, appetite disorders, and digestive tract disorders(12). Improper sanitation can invite the emergence of infectious diseases in toddlers such as diarrhea and worms which can interfere with the digestive process in absorbing nutrients. Environmental sanitation as the status of a healthy environment must meet criteria such as healthy houses, provision of basic sanitation facilities (such as clean water, toilet facilities, waste water disposal facilities and trash facilities) and occupant behavior(13). Healthy households environmental sanitation status shows the family's social economy, knowledge and clean and healthy living behavior in the family structure, especially the mother's behavior and knowledge(7).

Basic environmental health data in seven villages within the scope of work of Temon 2 Community Health Center in 2019, namely access to clean water was 73% from the standard 81%, access to family latrines was 80% from the standard 85% and access to SPAL was 30% from the standard 20%. This shows that access to clean water and

access to latrines is still a sanitation problem in the Temon 2 Community Health Center working area. The aim of this research is to identify whether there is a relationship between family environmental sanitation and the incidence of stunting in toddlers aged 6 - 59 months in the Community Health Center working area in Temon 2 Kulon Progo Regency.

2. METHODS

This study is quantitative analytical research with a retrospective case-control approach. The study was carried out from January-March 2021. The study was located at the Health Post for Infant/Toddler & Mothers (Posyandu) in the work area of Temon 2 Health Center, Kulon Progo Regency, DI Yogyakarta Province.

The population in this study were all research subjects, namely all toddlers aged 6-59 months at Temon 2 Community Health Center, Kulon Progo Regency, DI Yogyakarta Province, namely 400 toddlers. The total sample in this study was 240 respondents taken from Temon Community Health Center nutrition report data. 2 which consisted of a case group of 80 respondents and a control group of 160 respondents. The ratio between the case group and the control group is 1:2. Sampling in this study was carried out using a purposive sampling technique, namely a sampling technique based on certain considerations. Samples taken must meet the inclusion and exclusion criteria. The inclusion criteria fulfill the criteria for being a sample or subject, while the exclusion criteria do not meet the criteria for being a sample or subject. The samples taken must meet the inclusion and exclusion criteria of 80 subjects for the case group and 160 for the control group. The case group in this study are stunted toddlers (Short and very short) and the control group in this study are non-stunted/Normal toddlers who meet the criteria. inclusion and exclusion.

The variables used in this research are: Independent variables (family environmental sanitation, clean water facilities, healthy latrines, waste disposal facilities (trash cans), and SPAL facilities (waste water disposal channels). The dependent variable in this study is stunting status in toddlers aged 6-59 months. The type of data used is Primary Data by communicating directly with the subjects to extract data on the identity and characteristics of respondents, namely name, age and gender, height, weight as well as conducting direct interviews with respondents in filling out the questionnaire sheet. Environmental Sanitation by means of rotating invitations and using health protocols because we are still in a pandemic situation. Secondary data obtained by researchers from existing data, both from data at the Temon 2 Community Health Center and from respondents' KIA books, secondary data in this research includes stunting data.

Data collection was carried out by researchers assisted by local posyandu health workers (enumerators) by looking at the data of all toddlers at the Temon 2 Community Health Center including stunting toddlers as the case group and non-stunted/normal toddlers as the control group. Carrying out sample screening in the case and control groups based on inclusion and exclusion criteria, The required number of each case and control group is taken according to the predetermined sample size d), Grouping each case and control group then inviting and conducting direct interviews. The interview data was filled in on the family environmental sanitation questionnaire sheet by researchers and Darbin health workers based on the answers from respondents. Another data is seen in the KIA book and Puskesmas data due to implementing health protocols during the Covid 19 pandemic. After the data is collected, data processing is

then carried out, the data processing process is divided into three stages, namely: editing, coding and tabulation. The data that has been processed is then analyzed using the univariate analysis method to analyze the variables of family environmental sanitation, clean water facilities, healthy latrines, waste disposal facilities (trash cans), waste water disposal system facilities by creating a frequency distribution table. Bivariate analysis using the chi square test was carried out to test the hypothesis regarding whether or not there was a relationship between the independent variable and the dependent variable using a = 0.05 and a Confidence Interval (CI) of 95%.

3. RESULTS

Subject's Characteristics

Table 1 shows data on the characteristics of the research subjects. Data on the characteristics of children under five obtained during data collection revealed that the majority were girls (52.9%). Apart from that, the majority of toddlers were aged 49-59 months, namely 64 (26.7%) and the least aged <12 months 19 (7.9%). The results of data collection on the determinants of health quality of household environmental sanitation where toddlers live show that the majority of toddlers have healthy family environmental sanitation 124 (51.7%), the majority of toddlers have clean water facilities that meet the requirements (62.9%), some The majority of toddlers have healthy toilets that qualified (61.7%), the majority of toddlers have waste disposal facilities that not qualified about 121 (50.4%), and the majority of toddlers have wastewater disposal facilities that qualified 150 (62.5%) .

Table 1. Characteristic of the subjects (N=240)

Variables	n	%
Gender		
Boys	113	47.1
Girls	127	52.9
Age Group		
≤ 12 months	19	7.9
13-23 months	49	20.4
24-36 months	50	20.8
37-48 months	58	24.2
49-59 months	64	26.7
Family Sanitation Status		
Healthy	124	51.7
Not Healthy	116	48.3
Clean Water Availability Status		
Qualified	151	62.9
Not Qualified	89	37.1
Healthy Latrines Status		
Qualified	148	61.7
Not Qualified	92	28.3
Waste Disposal Facilities		

Variables	n	%
Qualified	119	49.6
Not Qualified	121	50.4
Waste Water Disposal Facilities		
Qualified	150	62.5
Not Qualified	190	37.5

Status Stunting Prevalence

Based on Figure 1, it can be seen that there were 80 (33.3%) stunted toddlers and 160 (66.7%) non-stunting toddlers.

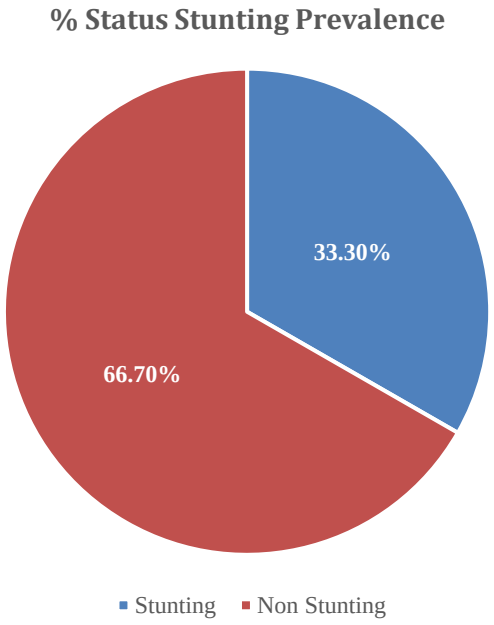

Figure 1. Status Stunting Prevalence

Sanitation Status and Stunting Association

Based on Table 2, it can be seen that of the 124 toddlers whose family environmental sanitation was healthy, 34 (27.4%) experienced stunting and 46 (39.7%) of the 116 toddlers whose family environmental sanitation was unhealthy experienced stunting. There is a significant relationship between family environmental sanitation and the incidence of stunting at the Temon 2 Community Health Center, Kulon Progo district. The OR value (95% CI) = 1.7 (1.01-2.99) shows that family environmental sanitation is a risk factor for stunting, namely showing that toddlers with unhealthy family environmental sanitation have 2 times the risk of experiencing stunting compared to toddlers with healthy family environmental sanitation. Of the 151 toddlers with clean water facilities, only 41 (27.2%) met the requirements to experience stunting and 29 (43.8%) of the 89 toddlers with clean water facilities did not meet the requirements to experience stunting. There is a significant relationship between clean water facilities and the incidence of stunting at Temon 2 Health

Center, Kulon Progo district. The OR value (95% CI) = 2.1 (1.20-3.62) shows that toddlers with clean water facilities that do not meet the requirements have 2 times the risk of experiencing stunting compared to toddlers with clean water facilities that meet the requirements.

Table 2. The Association of Sanitation Health with Stunting Status (N=240)

	Stunting		*Non-Stunting*		Total		p	OR (95% CI)
	n	%	n	%	n	%		
Family sanitation status								
Healthy	34	27.4	90	72.6	124	51.6	0.046	1.7
Not Healthy	46	39.7	70	60.3	116	49.4		(1.01-2.99)
Clean water availability status								
Qualified	41	27.2	110	72.8	151	62.9	0.012	2.1
Not Qualified	29	43.8	50	56.2	89	37.1		(1.20-3.62)
Healthy Latrines Status								
Qualified	44	29,7	104	70.3	148	61.6	0.173	1.5
Not Qualified	36	39.1	56	80.9	92	38.4		(0.87-2.02)
Waste Disposal Facilities								
Qualified	32	26.9	87	73.1	119	49.5	0.050	1.8
Not Qualified	48	39.7	73	60.3	121	50.5		(1.03-3.08)
Waste Water Disposal Facilities								
Qualified	44	29.3	106	70.7	150	62.5	0.120	1.6
Not Qualified	30	40.0	60.0	60	90	37.5		(0.93-2.78)

CI, Confidence Interval.

Of the 148 toddlers with healthy toilet facilities who met the requirements, 44 (29.7%) experienced stunting and 36 (39.1%) of the 92 toddlers with healthy toilet facilities who did not meet the requirements experienced stunting. The results of statistical tests using the chi square test obtained a p-value of 0.173, which means there is no significant relationship between healthy toilet facilities and the incidence of stunting at the Temon 2 Kulon Progo Community Health Center. The OR value (95% CI) = 1.5 (0.87-2.02) shows that toddlers who have healthy toilet facilities that do not meet the requirements have 2 times the risk of experiencing stunting compared to toddlers who have healthy toilet facilities that meet the requirements. Then it was found that of the 119 toddlers whose waste disposal facilities met the requirements, 32 people (26.9%) experienced stunting and 48 (39.7%) of the 121 toddlers whose waste disposal facilities (trash cans) did not meet the requirements experienced stunting. There is no significant relationship between waste disposal facilities (trash cans) and the incidence of stunting at Temon 2 Health Center, Kulon Progo district. Of the 150 toddlers with wastewater disposal facilities that met the requirements, 44 (29.3%) experienced stunting and 36 people (40.0%) of the 90 toddlers with wastewater disposal facilities that did not meet the requirements experienced stunting. There is no significant relationship between waste water disposal facilities (SPAL) and the incidence of stunting at Temon 2 Health Center, Kulon Progo district.

4. DISCUSSIONS

The Relationship between Family Environmental Sanitation and Stunting Incidents

In general, sanitation is an effort made by humans to create and ensure environmental conditions, especially the physical environment, that comply with health requirements. Sanitary conditions that are inadequate and inappropriate will cause the emergence of infectious diseases so that energy for growth is diverted to fighting infection, resulting in growth being disrupted (14). The results of this research show that there is a relationship between family environmental sanitation and the incidence of stunting at the Temon 2 Community Health Center. Difficulty accessing sanitation and inadequate sanitation can trigger stunting in children. Sanitation is a deliberate behavior in cultivating clean living which aims to prevent humans from coming into direct contact with dirt and other dangerous waste materials in the hope of maintaining and improving human health.

The results of this research are in line with the results of research conducted by Gladys and Sandra in 2018 in developing countries and Southeast Asia which showed that if environmental sanitation is not good, toddlers are five times more likely to experience stunting (15). The results of other similar research conducted by Wulandari, et al in 2019 showed that there was a relationship between environmental sanitation and the incidence of stunting in the working area of the Kerkep Community Health Center, North Bengkulu district (16). Other research by Fitri in 2020 also shows that there is a relationship between family environmental sanitation and the incidence of stunting in toddlers in the work area of the Panti Health Center, Jember district (17). Poor environmental sanitation will cause diarrhea, worms and digestive tract infections. Children who suffer from digestive tract diseases will experience impaired absorption of nutrients in their bodies. A body that lacks nutrients will be susceptible to disease and growth will be disrupted (18).

The Relationship between Clean Water Facilities and Stunting Incidents

Drinking water sources are said to be suitable if the drinking water source is protected, such as tap water (tap), public tap, rainwater reservoir (PAH) or protected springs and wells, drilled wells or pumps with a distance of at least 10 meters from sewage, waste storage, and garbage disposal. Clean water facilities are the dominant factor causing diarrhea in toddlers. Therefore, a protected and uncontaminated water source is very important to prevent diarrhea (19). The results of this research show that there is a significant relationship between clean water facilities and the incidence of stunting for toddlers aged 6-59 months at Temon 2 Health Center, Kulon Progo Regency. The results of this study are in accordance with Ardiyanti's statement, namely that children who come from families with unprotected water sources and inadequate types of toilets have a risk of suffering from stunting 1.3 times higher than children who come from families with protected water sources and types of toilets (20). Another finding of this study shows that toddlers from families who have unprotected drinking water sources experience more stunting than toddlers from families who have protected drinking water sources. Studies proved that there is a relationship between drinking water sources and the incidence of toddler stunting. Toddlers whose families have unprotected drinking water sources are 1.35 times more at risk of experiencing stunting compared to toddlers whose families have protected drinking water sources (21).

The results of this research are in line with the results of Yuliani Soercmad's research which shows that there is a relationship between household water management and the incidence of toddler stunting in Wonomulyo (22). Similar research was also conducted by Amrul and Haris in 2018 which showed that families who do not have access to clean water sources are sixt times more likely to suffer from stunting (21).

The relationship between healthy toilet facilities and the incidence of stunting

A latrine is a place to dispose of human waste, usually called a latrine or toilet, with or without a toilet equipped with a container for waste or feces, so that it does not cause the spread of disease and pollutes the surrounding environment. The sanitary conditions for household latrines that meet the requirements in this study are as follows: family latrine available, own latrine, distance between the latrine and water source is approximately 15 meters, the latrine is well maintained, the type of latrine used is sanitary, the latrine has ventilation, the latrine does not pollute the area surroundings or environment (23). The results of this study show no relationship between healthy latrine facilities and the incidence of stunting at the Temon 2 Community Health Center, Kulon Progo Regency. The researcher believes that the results of this study show that there is no relationship because only one indicator of a healthy latrine used in this study is ownership of a goose neck latrine and a septic tank. So this is contrary to the theory which states that the existence of latrines that do not meet standards theoretically has the potential to trigger the emergence of infectious diseases due to poor hygiene and sanitation (for example diarrhea and worms) which can disrupt the absorption of nutrients in the digestive process (16).

The results of this research are in line with the results of Afadillah and Lilatul's 2019 research in the Kotakulon-Bondowoso Community Health Center working area which showed that there was no relationship between latrine ownership and stunting. Other similar research results also show that there is no significant relationship between latrine ownership and the nutritional status of children aged 0-23 months on Nain Island, North Minahasa Regency (13). The research results that are not in line with this research are the results of Maya Adiyanti's research in 2010 Indonesia which showed that there was a significant relationship between the type of latrine and the incidence of stunting in toddlers. The results of her research showed that families who used toilets that were not suitable for their toddlers had a risk of suffering from stunting 1.3 times higher than those from families who use adequate household latrine facilities (20). This research is also not in line with research by Amrul and Haris in 2019 which showed that households that do not have access to healthy toilets, their toddlers are at risk of suffering from stunting (21).

The relationship between waste disposal facilities (trash cans) and the incidence of stunting

Sanitary requirements for waste disposal that meet the requirements in this study include: the availability of temporary rubbish dumps, rubbish bins that have lids that are easy to open and do not dirty hands, rubbish bins made of strong and waterproof materials, rubbish bins that are not flooded with water, the waste bin is not infested with insects, the distance of the waste disposal site is less than 10 meters from a water source, the disposal site is not in an open area (river, pond, yard, etc.), the waste disposal is transported to the landfill with

a minimum of 3x24 hours transportation (24). The results of the analysis in this study show that there is no significant relationship between waste disposal facilities and the incidence of stunting. The results of the observations found that most of the trash cans had lids, although there were still some that were still open, the trash cans were made from materials that were not watertight and had lids. Researchers are of the opinion that the results of research on waste security facilities (trash cans) are not related to the incidence of toddler stunting in Temon 2 Community Health Center working area because researchers only used indicators for closed and watertight trash bins.

The results of this research are not in line with the results of research conducted by Yuliani Soerachmad in 2019 which showed that respondents who did not use household waste protection were at risk of stunting than respondents who used household waste protection (22). The results of other research which are also inconsistent, conducted by Umar and Triharyo, 2019, show that toddlers who live in environments with unsafe waste disposal had multiple risk of experiencing stunting (25). Unsafe sanitation and waste disposal will give rise to many bacteria which are very susceptible, especially in toddlers, where toddlers will easily get sick and experience impaired absorption of nutrients. Impaired absorption of nutrients will cause nutritional deficiencies. Toddlers who lack nutrients are at risk of experiencing stunting.

The relationship between waste water disposal facilities (SPAL) and the incidence of stunting

Waste water is the remainder of a business or activity in liquid form. Waste water can come from households (domestic) or industry (industrial). Wastewater contains a lot of disease germs, especially if wastewater has open disposal, it has the potential to become environmental pollution and trigger various disease germs, so it is very important for every household to have wastewater treatment that meets health requirements to reduce various kinds of disease., one of which is the trigger for stunting in toddlers (24). The results in this study showed no relationship between waste water disposal facilities and the incidence of stunting. The researcher believes that the results of this study show that there is no relationship between waste water disposal facilities and the incidence of stunting among toddlers in the Temon 2 health center working area because waste water disposal facilities are adequate and far from clean water sources.

The results of this research are not in line with the results of Yuliani's (2019) research which shows that households that do not secure wastewater drainage channels twice are at risk of stunting (22). Then, it is also not in line with the results of Hasan and Kadarusman's research which shows that access to waste water disposal facilities is a risk factor for stunting in toddlers (21).

5. CONCLUSIONS

This study found that families who do not meet the requirements for the availability of clean water will tend to double the risk of their children being stunted. The government as a policy maker needs to pay attention to the availability of clean water to the community as an effort to prevent stunting in children in Kulon Progo, Indonesia.

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