

Is Environmental Sanitation as A Trigger Factor Leading to Stunting?

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ABSTRACT

Background: Stunting became a chronic malnutrition issue that illustrates a growth failure. The prevalence of stunting is around 31-35%, which Demak contributes to 6,82% of children under five with stunting.

Purpose: The major aim of the study was to determine the relationship between environmental sanitation with stunting.

Methods: The study design used a cross-sectional community-based survey. The population was 32 mothers with stunting children under five years, and there were 30 wholes who were eligible for inclusion criteria. Data were collected by proportional random sampling, and data analysis performed a descriptive analysis dan chi-square test.

Results: Environmental sanitation contributes to stunting ($p=0,002 < 0,005$). This study found that environmental sanitation such as water and house characteristics, and domestic waste disposal have significant factors leading to stunting.

Conclusion: Good water, sanitation, and hygiene practice are related to stunting. The mother and family needily to keep a healthy environment to prevent stunts.

Keywords: Sanitation; Water; Environmental; Stunting.

BACKGROUND

Stunting is a chronic malnutrition problem described as a form of growth failure, where it will be seen physically manifesting at the age of 24-59 months (Bella *et al.*, 2020). Determination of *stunting* is carried out based on the indicator of height according to age, where the results of anthropometric measurements show Z-Score <-2 SD ((Damayanti *et al.*, 2017; Mentari & Hermansyah, 2019). Stunting factors include the coverage and quality of health services, infectious diseases, hygiene practices, non-implementation of early breastfeeding initiation, failure of exclusive breastfeeding, early weaning process, social conditions, and sanitation of residences (Kullu *et al.*, 2018; Wellina *et al.*, 2016). Stunting can lead to impaired physical, mental, intellectual, and cognitive development (Apriani, 2018; Cahyono F., Manongga S.P., 2016; Laili, 2019). Another impact is a higher risk of death than children who grow normally, psychosocial is not optimal when adults are at risk of obesity and non-communicable diseases such as hypertension and diabetes (Beckmann *et al.*, 2021; de Onis & Branca, 2016; Desyanti & Nindya, 2017).

The prevalence of *stunting* in the world in 2018 in the toddler group was 29.6% and clowning was 20.1%. The stunting rate in Indonesia in 2018 for toddlers was 30.8% and in clowning 29.9% (C.P.C. *et al.*, 2016; Hamed *et al.*, 2020; Mehmood *et al.*, 2022). In Central Java, in 2018 the prevalence of *stunting* in toddlers was 31.3%, whereas Demak in 2019 was the district with the highest *stunting* number with a value of 6.82% (Tim Riskesdas, 2019). Environmental sanitation is the effort of individuals or communities to monitor and control the environment to stay healthy, including clean water facilities, physical quality of water, availability of latrines, wastewater treatment, garbage disposal, soil pollution, and healthy home criteria (Aguayo & Menon, 2016; Budge *et al.*, 2019). Poor environmental sanitation can increase the incidence of infectious diseases that can make energy for growth diverted to the body's resistance to infection, nutrients are difficult to absorb by the body, and stunted growth (Apriani, 2018; Mulyaningsih *et al.*, 2021; WHO, 2017). Personal hygiene is self-care to maintain health, including hand washing time, cutting nails, and how to clean hands with soap and running water.

Poor personal hygiene practices will pose a high risk of bacteria. These bacteria will enter the child's body through food and can have an impact on the child's health so that if not immediately followed up and balanced with the appropriate intake, there will be a failure to grow (Aguayo & Menon, 2016; Apriani, 2018; Budge *et al.*, 2019; Mulyaningsih *et al.*, 2021; WHO, 2017). Another factor is the mother's knowledge of nutrition which can lead to practice in providing nutrition to toddlers (overt behavior). Mothers with poor nutritional knowledge tend to pay less attention to the nutrition intake given to their children, which can lead to malnourishment and stunted children. Initial breastfeeding is the best nutrition for babies from birth until 6 months, without adding and/or replacing them with other foods or beverages (except drugs, vitamins, and minerals) (Annisa *et al.*, 2019; Fitri, 2018).

OBJECTIVE

The major aim of the study is to determine the relationship between environmental sanitation with stunting.

METHODS

This research is used on a cross-sectional analysis of baseline data (collected in July-September 2020). The population was *stunting* toddlers aged 24-59 months that registered in the Community health center. Sample was 30 toddlers that used proportional random sampling methods. Instruments used environmental sanitation questionnaires consisting of 16 statements, 4 items on water characteristics, 5 items on domestic waste disposal and 7 items on house characteristics with the *r* value 0,605-0,635 and *Chronbach Alpha* 0,796.

RESULTS

The respondents of this study were mothers and their children in the Community health center of Sayung, Demak, Central Java. Water characteristics, domestic waste disposal, and house characteristics illustrate in this table 1.

Table 1. Description frequency of water characteristics, domestic waste disposal, and house characteristics (n=30)

Variable	Yes		No	
	F	%	F	%
Water characteristics				
Tasted water	4	13.3	26	86.7
smelly water	5	16.7	25	83.3
colored water	4	13.3	26	86.7
turbid water	7	23.3	23	76.7
Domestic waste disposal				
Puddles that become nests of insects/mosquitoes	13	43.3	17	56.7
Muddy, damp, and unsightly	12	40.0	18	60.0
Trash bin availability	21	70.0	9	30.0
The gutter flows smoothly	2	6.7	28	93.3
Closed trash bin	16	53.3	14	46.7
House characteristics				
House located in the highlands areas	10	33.3	20	66.7
Indoor ventilation	17	56.7	13	43.3
Natural lighthouse	19	63.3	11	36.7
House floor made of tiles or ceramics	24	80.0	6	20.0
Floor conditions (dusty or humid)	17	56.7	13	43.3
Flooded house during the rainy season	14	46.7	16	53.3
Swan neck latrine	29	96.7	1	3.3

Table 1. illustrate that the majority of bad water characteristics are the level of turbidity and the smell of water, waste management is also not optimal, most of each house does not have a trash bin availability, and even 53.3% is in an open condition. The house conditions are humid and dusty as much as 56.7%.

Table 2. Correlation environmental sanitation with stunting (n=30)

Environmental Sanitation	Short		Very Short		Total		P-Value
	F	%	F	%	F	%	
Good	15	88,2	2	11,8	17	100	0,002
Bad	6	46,2	7	53,8	13	100	
Total	21	70	9	30	30	100	

Table 2 shows that good environmental sanitation experienced very short stunting as many as 2 children (11.8%) and as many as 6 (46.2%) children with poor sanitation but short stunting. There is a relationship between environmental sanitation and stunting with a P-value of 0.002.

DISCUSSION

Stunting can produce negative health effects such as difficulty in achieving optimal physical and cognitive development, and reduced performance (Hijrawati et al., 2021; Kang et al., 2018; Nahar et al., 2020). Some studies have also reported that children with underweight can increase risk of chronic non-communicable diseases (Aguilera Vasquez & Daher, 2019; Musaiger et al., 2011). Environmental sanitation is defined as activities aimed at improving and maintaining standards of basic environmental conditions that affect human well-being. The district environmental health index is determined based on the population's access to sanitation and clean water (Aguayo & Menon, 2016; Cumming & Cairncross, 2016). Access to sanitation is measured based on ownership of the type of defecation facility and the type of toilet used, it is said to be good if it has its own facilities and the type of toilet is goose-neck. Access to clean water is measured based on the use of clean water per capita in a household of at least 20 liters/ per person/day (Budge et al., 2019; Rahayu & Darmawan, 2019). Based on the Health environmental index from 0 to 1 (0: not good, 1: good) with sources according to the provisions, the Community Health Development Index (IPKM).

Environmental health conditions are associated with nutritional status, especially the prevalence of stunting in children under five and also children 5-18 years old, the problem of stunted children in districts/cities is closely related to environmental health factors that are not good or the prevalence of stunting will decrease if environmental health conditions are good (Apriani, 2018; de Onis & Branca, 2016; Kwami et al., 2019). Improved access to sanitation and clean water will reduce stunting in toddlers by 20.58 percent or 27.55 percent, in short children 5-18 years old, if the environmental health index can be equal to 1, otherwise if it is equal to 0, then the prevalence of stunting in children is 5-18 years old under five will remain 49.3 percent or in the shortage of 5-18 years will remain 47.3 percent. Lack or excess of one of the chemicals in water can cause physiological disturbances in humans (Cumming & Cairncross, 2016).

Environmental factors that have been proven to cause stunting include sanitation: access to better sanitation can protect children from stunting by around 70.6% (Ademas et al., 2021; S. Das et al., 2021). This study uses the variable of private latrine ownership. It shows that if access to latrines increases, the incidence of stunting will decrease. Residential houses what a house is made of affects children's health, especially stunting. House floors made of soil can increase the incidence of stunting. Children who live in houses with dirt floors can get diseases that are one of the factors that trigger stunting,

for example, Chagas disease, which is an endemic disease in South America and is the agent of stunting (Beckmann et al., 2021; Musaiger et al., 2011). The condition of the house used by people for shelter includes the necessary facilities and services, useful equipment for physical and spiritual health, as well as good social conditions for families and individuals so that they must meet the requirements for ventilation, lighting, floor, and location health (Ademas et al., 2021; Laili, 2019).

Result of analysis there is a significant relationship between environmental sanitation and *stunting* events (Budge et al., 2019; Kwami et al., 2019; Vilcins et al., 2018). Inadequate environmental sanitation is the leading cause of disease worldwide and indirectly affects the health of toddlers which can ultimately affect the condition of the toddler's nutritional status and cause the child's growth to be not optimal (Aguilera Vasquez & Daher, 2019; Damayanti et al., 2017; Musaiger et al., 2011). Poor environmental sanitation can cause children to experience *environmental enteropathy* (subclinical disorders of the intestine, especially the small intestine caused by *poor environmental hygiene* and sanitation) which has an impact on the difficulty of absorption of nutrients (Mehmood et al., 2022; Niswatul & Marjan, 2020). Lack of sanitation and poor environment can also facilitate the transmission of several infectious diseases, namely diarrhea, cholera, typhoid fever, dysentery, hepatitis A and E, skin diseases, malnutrition and distress (Bolte & Aagaard, 2020; R. Das et al., 2022; Ogasawara & Inoue, 2018; Wilson-Jones et al., 2019).

This disease consumes a certain amount of protein and calories that should be used for growth, and will decrease the body's ability to absorb substances needed by the body for the repair of damaged tissues, form new cells and energy sources are not available adequately (Ruaida N., 2018). This will affect the immune system, weak immune system and not accompanied by adequate nutritional intake so that children will often experience recurrent gastrointestinal infections that will increase the risk of malnutrition more severely. Poor nutritional status combined with infection can cause growth delays (Hijrawati et al., 2021; Kang et al., 2018). This is in accordance with previous research that states that the more often children experience infectious diseases, the higher the incidence of *stunting* in toddlers (R. Das et al., 2022; Gordon & Maule, 1989).

Stunting potential is reduced if there are interventions focused on behavioral changes in good sanitation and hygiene that contribute to a 27% reduction in *stunting* (Ademas et al., 2021; WHO, 2015). To cut the stunting chain, pregnant women and children need to live in a clean environment. This research is in line with previous research that states that poor environmental sanitation is associated with stunting events in toddlers with a P-value of 0.000. However, contrary to previous research that states that there is no effect of sanitation of the residential environment on the incidence of *stunting* in toddlers.

CONCLUSION

This study highlighted the importance of environmental status as predictor factor for stunting, in term of water, and house characteristics, and domestic waste disposal factors. Further research should investigate other factors that contribute to stunting and the methods of handling stunting prevention.

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