



Relationship between Environmental Sanitation and PHBS and the Incidence of Stunting among Toddlers Aged 12–59 Months

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ABSTRACT

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Stunting remains a significant public health issue in Indonesia, as its national prevalence exceeds WHO standards. Purworejo Regency, located in Central Java, is among the areas prioritized for poverty and stunting reduction efforts. This research aimed to analyze the correlation between environmental sanitation, Clean and Healthy Living Behavior (PHBS), and stunting among children aged 12–59 months within the Grabag Health Center area. Using a quantitative case-control design, the study involved 104 respondents, consisting of 52 cases and 52 controls. Data were analyzed using the chi-square test and odds ratio (OR). The findings demonstrated a significant link between environmental sanitation and stunting ($p < 0.05$, $OR = 6.296$), indicating that children residing in unhygienic surroundings were over six times more likely to experience stunting. A significant association was also found between poor PHBS and stunting ($p = 0.000$, $OR = 10.360$), indicating a tenfold increased risk. Based on these findings, it is recommended that health workers, particularly midwives, collaborate with *posyandu* (integrated health post) cadres to enhance parental knowledge through education on the importance of proper environmental sanitation and PHBS, in order to protect children from stunting and related health risks.

INTRODUCTION

Stunting represents one of the major nutritional challenges affecting communities, particularly among children under five years old. This condition is typically assessed using anthropometric indicators such as the Height-for-Age (HAZ) or Weight-for-Age (WAZ) index, which classify children as stunted (short) or severely stunted (very short). Stunting is a condition in which children under five years of age are shorter than the expected height for their age. Stunting is a growth and development disorder that occurs in children due to poor nutrition, recurrent infectious diseases, and low psychosocial stimulation⁽¹⁾.

Nationally, Indonesia experienced a 2.8% decline in stunting prevalence from 2021 to 2022, reaching 21.6%. Although the prevalence of stunting has been reduced, stunting in Indonesia remains a problem because the national prevalence is still above the WHO standard of 20%⁽²⁾. Based on data from the 2022 Nutrition Status Study (SSGI), the stunting rate in Central Java is still at 20.8%. Purworejo Regency is recorded as one of the areas with a high prevalence of stunting in toddlers. The



prevalence of stunting in Purworejo Regency in 2021 was 15.7% based on the results of the Indonesian Nutrition Status Study (SSGI). In 2022, there were 3,815 stunted toddlers in 28 villages.

The determinants of stunting are multifactorial, encompassing both direct and indirect influences. Among the indirect factors, Water, Sanitation, and Hygiene (WASH) elements—such as access to safe drinking water, toilet availability, and hygiene practices like regular handwashing with soap—play a critical role. Environmental sanitation and personal hygiene play an important role in stunting, such as frequent infectious diseases in children and low rates of proper hand washing with soap, which can increase the incidence of diarrhea⁽³⁾. Infectious diseases are one of the risk factors for stunting, because infectious diseases first interfere with the absorption of children's nutrients so that the child's catabolic process decreases, then it will disrupt consumption patterns and affect the child's nutritional status⁽⁴⁾. Infectious diseases affect nutritional intake in toddlers if nutritional intake decreases can inhibit the growth of toddlers such as stunting⁽⁵⁾. Supporting evidence from Kencanawati et al. (2020) revealed a significant correlation between sanitation practices and nutritional status among preschool children, showing that those living in cleaner environments generally exhibited normal growth, whereas poor sanitation conditions heightened the likelihood of stunting⁽⁶⁾.

Clean and Healthy Living Behavior (PHBS) encompasses actions that individuals and families adopt to prevent disease and maintain well-being, with sanitation and hygiene being core components. Behavioral factors, including PHBS adherence, are estimated to influence 30–35% of overall health outcomes⁽⁷⁾. Apriani's (2018) research states that the implementation of PHBS at home is related to nutritional status, especially stunting in children. Family health and nutritional status can be improved by practicing clean and healthy living⁽⁸⁾.

Stunting adversely affects both the physical and cognitive development of children, necessitating serious public health attention. Children who experience stunting often face reduced intellectual capacity and productivity, along with a heightened vulnerability to chronic and degenerative diseases later in life. In addition, children with stunting conditions also increase the risk of obesity, this is because a short body will have a low ideal weight. For stunted children, weight gain of only a few pounds will increase the value of body mass index (BMI) beyond normal limits⁽⁹⁾.

The government's efforts to accelerate stunting reduction are through specific nutritional interventions and sensitive nutritional interventions⁽¹⁰⁾. In September 2019, the Purworejo Regency government launched a socialization program on "Nutrition and Stunting Issues". The purpose of this socialization was to accelerate 8 convergence actions to combat stunting. The Purworejo Regency Government also formed a Stunting Reduction Acceleration Team (TPPS) with members from all stakeholders related to stunting and invited sub-district heads and village heads/lurah from 28 stunting locations in 2023 to sign a joint commitment to accelerate stunting reduction as an effort to reduce stunting in an integrated and sustainable manner.

Basic Health Research Data (RISKESDAS) in 2018 showed that 30.8% of people still throw toddler feces carelessly. The proportion of waste disposal sites are mostly without shelter or no means to collect waste water so that it stagnates on the ground. 76.5% of wet/organic waste shelters are open, the quality of household waste management is not good, namely 80.3% of waste is burned, thrown into rivers/ditches/seas or disposed of carelessly⁽¹¹⁾. A preliminary PHBS assessment conducted in Purworejo Regency in 2017 showed that only 76.9% of households achieved the "main healthy" and "completely healthy" strata—still below the 100% target established in the 2017 Minimum Service Standards (SPM).

Despite various government programs, the persistence of high stunting rates has become a major concern for the Purworejo District Government to reduce stunting rates in Purworejo District.





Resolving the stunting issue requires a long time, and commitment must be continuous and sustainable. In addition, it is necessary to identify the factors causing the increase in stunting rates so that they can be anticipated and prevented in a programmatic manner. In light of this background, the present study aims to examine the relationship between environmental sanitation, Clean and Healthy Living Behavior (PHBS), and stunting among children aged 12–59 months in the Grabag Health Center service area.

METHOD

The research was conducted in December 2023 within the operational area of the Grabag Community Health Center, where an increase in stunting cases was observed despite the implementation of government intervention programs. This study employed an observational case–control design. The target population comprised all children aged 12–59 months residing in the Grabag Health Center area. A total of 104 participants were recruited, consisting of 52 cases and 52 controls. Samples were selected using a simple random sampling technique with random allocation through a lottery system, where each village was assigned a number and drawn randomly. There are 5 villages from 32 selected villages, namely Bakurejo village with a sample of 20 respondents, Rejosari village with 26 respondents, Trimulyo village with 16 respondents, Tegalrejo village with 18 respondents, and Grabag village with 24 respondents. Data collection used primary and secondary data supported by interview questionnaires and observations to determine environmental sanitation and PHBS. Researchers conducted a study by visiting the homes of respondents who have toddlers aged 12–59 months door to door. Data collection is carried out if the mother of the toddler agrees to be a respondent and signs a consent sheet. The researchers conducted observations using a healthy home assessment sheet and conducted interviews with questionnaires including the toddler characteristics questionnaire and the family PHBS questionnaire to respondents. Data analysis was performed using the Chi-square test to examine associations between variables and the odds ratio (OR) to determine the magnitude of risk. Ethical clearance for this study was obtained from the Health Research Ethics Committee under approval number 1258/EA/KEPK/2023.

RESULTS AND DISCUSSION

Respondents Distribution

A univariate analysis was performed to present the distribution of both independent and dependent variables. The independent variables in this study included environmental sanitation and Clean and Healthy Living Behavior (PHBS), whereas the dependent variable was the incidence of stunting among toddlers. The descriptive results are summarized in Table 1.

Table 1.

Distribution of environmental sanitation, PHBS, and stunting among respondents

Variabel	Case		Control	
	n	%	n	%
Environmental Sanitation				
Unhealthy	40	76,9	18	34,6
Healthy	12	23,1	34	65,4
Amount	52	100	52	100
PHBS				
Not Good	37	71,2	10	19,2
Good	15	28,8	42	80,8
Amount	52	100	52	100



Based on Table 1 above shows that 40 out of 52 respondents with unhealthy environmental sanitation and stunted toddlers or as much as 76.9% and most have PHBS that is not good as many as 37 respondents (71.2%). While in 34 of 52 respondents with healthy environmental sanitation and have toddlers not stunting or as much as 65.4% and most have a good PHBS as many as 42 respondents (80.8%).

Relationship Between Environmental Sanitation and Stunting

Table 2.
Relationship between environmental sanitation and stunting in toddlers aged 12–59 months

Environmental Sanitation	Incidence of Stunting						<i>p-value*</i>	<i>OR</i>
	Yes		No		Total			
	f	%	f	%	f	%		
Unhealthy	40	69,0	18	31,0	58	100	0,000	6,296
Healthy	12	26,1	34	73,9	46	100		
Amount	52		52		104			

Table 2 shows that among the 58 respondents with unhealthy environmental sanitation, most had stunted toddlers, namely 40 respondents (69.0%). Meanwhile, among the 46 respondents with healthy environmental sanitation, most had toddlers who were not stunted, namely 34 respondents (73.9%). The Chi-square test yielded a *p-value* of 0.000 (< 0.05), indicating a statistically significant relationship between environmental sanitation and the occurrence of stunting among children aged 12–59 months within the Grabag Health Center area. The calculated odds ratio (OR) was 6.296, suggesting that children from households with poor sanitation were approximately six times more likely to experience stunting than those from well-sanitized households (95% CI).

The analysis showed a significant relationship between environmental sanitation and stunting ($p = 0.000 < 0.05$). Respondents with unhealthy environmental sanitation had a 6.296 times greater risk of having stunted toddlers compared to those with healthy sanitation (95% CI). This finding indicates that poor environmental conditions contribute substantially to stunting among children aged 12–59 months. The results of the study show a relationship between environmental sanitation and stunting in children aged 12–59 months, where the proportion of stunting is higher among respondents with unhealthy environmental sanitation. Environmental sanitation is a factor that can indirectly affect stunting in children. Poor sanitation can cause various infectious diseases in toddlers, such as diarrhea, intestinal worms, respiratory tract infections, tuberculosis, dengue fever, malaria, and typhoid fever, which can interfere with balanced nutritional intake and cause nutritional disorders in toddlers⁽¹²⁾. If this condition persists for a long time, it can cause stunting.

The present study's results are consistent with findings from Zalukhu et al. (2022), who also reported a significant correlation between environmental sanitation and stunting prevalence among toddlers ($p < 0.05$)⁽¹³⁾. Similar conclusions were drawn by previous studies, which highlighted that key sanitation components—including access to clean water, toilet ownership, and proper waste and wastewater management—were significantly linked to stunting outcomes ($p < 0.05$)⁽¹⁴⁾. Thus, children raised in unsanitary household environments remain at considerably higher risk of stunting compared to those growing up under clean and hygienic conditions.



Relationship Between PHBS and Stunting Incidence

Table 3.
 Relationship between PHBS and stunting in toddlers aged 12–59 months

PHBS	Incidence of Stunting						<i>p-value*</i>	<i>OR</i>
	Yes		No		Total			
	f	%	f	%	f	%		
Not Good	37	78,7	10	21,3	47	100	0,000	10,360
Good	15	26,3	42	73,7	57	100		
Amount	52		52		104			

Table 3 shows that among the 47 respondents with poor PHBS, most had stunted toddlers, namely 37 respondents (78.7%). Meanwhile, among the 57 respondents with good PHBS, most had toddlers who were not stunted, namely 42 respondents (73.7%). Statistical analysis using the Chi-square test yielded a *p-value* of 0.000 (< 0.05), confirming a significant association between PHBS and stunting among children aged 12–59 months in the Grabag Health Center area. The calculated odds ratio (OR) was 10.360, signifying that children from households with poor PHBS were approximately ten times more likely to experience stunting than those from households practicing good PHBS (95% CI).

The results revealed a significant relationship between PHBS and stunting ($p = 0.000 < 0.05$). Respondents with poor PHBS had a 10.360 times higher risk of having stunted toddlers than those with good PHBS (95% CI). This highlights that poor hygiene and health behaviors in families are key contributors to stunting in children. PHBS is essentially a preventive behavior adopted by individuals or families to avoid various diseases. PHBS is very important for reducing stunting, especially because children often suffer from infectious diseases and lack the habit of washing their hands with soap, which can cause diarrhea. Based on research by Nurhidayah et al (2022), there is a significant relationship between the use of clean water and the habit of washing hands with soap and stunting in toddlers, with a *p-value* of < 0.05 . A history of infectious diseases such as ARI and diarrhea, which are commonly experienced by toddlers, are the main causes of stunted growth because children experience a decrease in appetite due to illness, which results in impaired nutrient absorption⁽⁴⁾.

Another observation in this study revealed that many parents of toddlers were still engaged in smoking, a factor known to negatively affect children's growth and development. Cigarettes can clog blood vessels due to exposure to chemicals, especially nicotine, tar, and carbon monoxide. When blood vessels are clogged, children's bodies become more susceptible to disease because the balance of substances needed by the body for metabolism becomes imbalanced. This finding supports the research by Ahmad and Nurdin (2019), which reported that toddlers exposed to cigarette smoke had a 2.6-fold higher risk of stunting than those who were not exposed⁽¹⁵⁾.

The strong correlation observed between PHBS and stunting in this study is consistent with previous research by Aprizah (2021), who identified a similar association ($p = 0.004 < 0.05$)⁽¹⁶⁾. The results of this study are also in line with Apriani's (2018) research on the relationship between PHBS and stunting in toddlers, where based on statistical tests, a *p-value* of 0.000 was obtained, which means that there is a relationship between poor household PHBS and stunting in toddlers⁽⁸⁾. Households with poor PHBS implementation are more likely to increase the risk of stunting than households with good PHBS implementation.

One of the acceleration of prevention in the family structure that can be done is through partnerships, community empowerment, and communication of educational information (KIE) related to clean healthy living behavior (PHBS) and environmental sanitation. This community service activity aims to establish partnerships with puskesmas; increase knowledge about PHBS in *posyandu*



cadres and mothers through KIE strategies and Community Empowerment ⁽¹⁷⁾. These findings reinforce the importance of integrating environmental sanitation improvements and PHBS promotion in community health programs to reduce the risk of stunting sustainably.

CONCLUSION

The study concludes that both environmental sanitation and Clean and Healthy Living Behavior (PHBS) are significantly associated with the incidence of stunting among children aged 12–59 months. Poor environmental sanitation increases the risk of stunting by 6.3 times, while poor PHBS increases it by 10.4 times. Health workers are encouraged to collaborate with *posyandu* cadres to improve parents' knowledge and practices regarding sanitation and PHBS to prevent stunting.

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