
The Relationship between the Availability of Family Toilets and Handwashing Behavior with the Incidence of Stunting in the Maratua Islands District, Berau Regency

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Abstract

Stunting remains a crucial public health problem in island regions such as the Maratua Islands District, Berau Regency, where poor sanitation and hygiene exacerbate chronic malnutrition in children under five. This study aimed to analyze the relationship between the availability of family latrines, handwashing behavior, and stunting incidence. Using a quantitative, observational, analytic cross-sectional design, a total sample of 54 children under five in the region was sampled. Instruments included a validated handwashing behavior questionnaire, a standardized latrine observation sheet, and WHO anthropometric measurements; data analysis included univariate frequencies, and Spearman correlation ($\alpha=0.05$). The results showed a 100% prevalence of stunting (75.9% stunted, 24.1% severely stunted), with a significant correlation for handwashing behavior ($\rho=0.350$, $p=0.009$) but not significant for family latrines ($\rho=0.227$, $p=0.098$). Handwashing behavior is a top intervention priority over infrastructure in remote areas.

Keywords: Family Latrines, Handwashing Behavior, Indonesia, Stunting, WASH.

INTRODUCTION

Stunting remains a major global public health challenge, affecting approximately 150 million children under five years old worldwide according to the latest estimates. This chronic malnutrition indicator is closely linked to poor environmental sanitation, limited access to clean water, and inadequate hygiene practices, which hinder nutrient absorption and child growth. In regions with improved sanitation infrastructure, stunting rates are notably lower, underscoring the role of Water, Sanitation, and Hygiene (WASH) interventions.

The WASH framework emphasizes clean toilets and handwashing with soap (HWWS) as key to preventing infections that contribute to stunting. Households with access to sanitary facilities and clean water show reduced stunting risks, aligning with Sustainable Development Goals (SDGs) 2 and 6 for zero hunger and universal sanitation. Globally, progress has stalled, with projections missing 2030 targets by millions of children, particularly in vulnerable areas.

In Indonesia, stunting prevalence reached 21.5% in 2023 per the Nutritional Status Survey, exceeding the 14% target and driven by inadequate family toilets, poor HWWS, and limited clean water. Coastal and island communities face amplified risks due to geographic isolation and suboptimal infrastructure.

Family toilet availability often fails to correlate significantly with reduced stunting without consistent use and maintenance. Handwashing behavior, however, shows a stronger link, as suboptimal practices increase infection risks and nutrient malabsorption.

Existing studies predominantly focus on mainland settings, overlooking island-specific challenges such as water scarcity and socio-economic barriers. [Nasution & Susilawati, This leaves a critical evidence gap for tailored interventions in remote archipelagic regions like Maratua, where environmental factors may intensify stunting drivers.

This study aims to analyze the relationship between family toilet availability, handwashing behavior, and stunting incidence among toddlers in Maratua Islands Subdistrict, Berau Regency. Its urgency lies in addressing persistent high stunting rates in underserved island areas, informing targeted WASH policies to meet national targets and SDGs. The novelty stems from its focus on island contexts, filling gaps in prior mainland-centric research by providing empirical data for context-specific interventions.

RESEARCH METHODS

This study is a quantitative study with a cross-sectional analytical observational design to analyze the relationship between the availability of family toilets, handwashing behavior, and the incidence of stunting in toddlers in the Maratua Islands District, Berau Regency. The quantitative approach was chosen because it emphasizes the measurement of variables numerically and hypothesis testing through statistical analysis, in accordance with the postpositivist paradigm that aims to test the causal relationship between independent and dependent variables. The cross-sectional design allows for simultaneous data collection at a specific point in time, making it efficient for identifying associations without intervention, as recommended for public health epidemiological studies in remote areas.

The research instruments included a handwashing behavior questionnaire with soap, an observation sheet on the availability of family toilets that meet basic sanitation standards, and anthropometric measurements of height for age using a microtoise or longboard according to WHO Child Growth Standards. All instruments were tested for validity and reliability before use to ensure data integrity, with stunting grouped based on height-for-age indicators into normal, short, and very short, with short and very short categorized as stunting. Data analysis techniques included univariate analysis with frequencies and percentages for variable descriptions, The bivariate analysis used the Spearman correlation test to examine the relationships between variables, with a significance level of 0.05.

The study population was all toddlers in the Maratua Islands District, Berau Regency, with a sample of 54 toddlers selected using a total sampling technique considering the relatively small population size and allowing for the inclusion of all population members. This total sampling technique is appropriate for limited populations in island areas with remote access, where full representation can be achieved without significant sampling bias. The dependent variable was the incidence of stunting, while the independent variables included the availability of family toilets (present/absent) and handwashing behavior (good/poor) based on questionnaire scores.

The research procedure began with ethical approval from the relevant institutions, followed by data collection through structured interviews with parents or caregivers, direct observation of household sanitation facilities, and anthropometric measurements in the field during the current research year. Data were collected while maintaining the confidentiality of respondents' identities and obtaining informed consent, adhering to ethical research principles, including anonymity and data use for scientific purposes only. Data analysis was conducted in stages, from descriptive to inferential, using statistical software. The research was conducted in the Maratua Islands District to capture the unique environmental context of the archipelago.

RESULTS AND DISCUSSION

RESULTS

Characteristics	Category	N	%
Age	0-1 Year	7	13.0
	>1-3 Years	29	53.7
	>3-5 Years	18	33.3
Gender	Male	30	55.6
	Female	24	44.4
Weight	Very Low	7	13.0
	Low	24	44.4
	Normal	23	42.6
Height	Very Short	13	24.1
	Short	41	75.9

This study included 54 toddlers as participants, and all data was reported as complete and accurate. Based on the characteristics of the respondents, it seems that most of the children are between the ages of 1 and 3, then between the ages of 3 and 5, and finally, a very small number are between the ages of 0 and 1. This distribution shows that most of the people who responded are in a very important growth stage, where the chance of having problems with growth and development is quite high. The responders were predominantly male, with a relatively balanced ratio between males and females. This indicates that the research sample is comprehensively representative to delineate the conditions of the toddler population in the study area. The height status survey, which used the height-for-age indicator, found that all of the respondents were either short or very short. None of the children had a normal height. Most of the kids were in the short group, while the rest were in the very short group. This study demonstrates that the Maratua Islands subdistrict has a very high rate of stunting, which means that many toddlers in the area do not grow normally over a long period of time. The weight-for-age (W/A) indication showed that less than half of the people who answered had a normal weight, and more than half were either underweight or very underweight. This syndrome indicates that nutritional deficiencies remain common and may contribute to children's challenges in linear growth.

Variable Relationships	Correlation Coefficient (ρ)	p-value	Interpretation
X1 – Y	0,227	0,098	Not significant
X2 – Y	0,350	0,009	significant

The Spearman correlation analysis revealed a correlation coefficient of $\rho = 0.227$ and a p-value of 0.098 between household toilet availability (X1) and stunting incidence (Y). These data show a positive link with a weak correlation strength, however it is not statistically significant ($p > 0.05$). Consequently, the availability of household toilets does not exhibit a significant correlation with the incidence of stunting. The correlation coefficient between handwashing habit (X2) and stunting incidence (Y)* was $\rho = 0.350$, with a p-value of 0.009. This result shows that there is a statistically significant positive link ($p < 0.05$) with a low to moderate correlation strength. This means that not washing your hands well is linked to a higher rate of stunting.

DISCUSSION

The research findings reveal that the prevalence of stunting in Maratua Islands District is very high, with all toddlers in the sample having short or very low stature. This condition shows that stunting is a major and long-term public health issue in coastal and island areas, where it is usually difficult to get medical care, clean up after yourself, and keep your family fed. Long-term exposure to

hunger, repeated illnesses, and poor settings, especially during the first 1000 days of life (HPK), can lead to stunting. During this time, even small changes in a child's diet or exposure to illness can have long-lasting effects on their cognitive and linear growth. In terms of environmental cleanliness, having family toilets should, in theory, lower the risk of diseases that are caused by the environment, especially diarrhea and gastrointestinal infections, which can make it harder for the body to absorb nutrients. Nonetheless, the findings of this study demonstrate that the presence of household latrines does not exhibit a significant correlation with the prevalence of stunting. This could be because of a few things, such as low data variation because almost all of the respondents are stunted, variances in the unmeasured quality of latrine, or the fact that owning a latrine doesn't always mean that people use it correctly and consistently.

On the other hand, handwashing behavior was strongly linked to the incidence of stunting, which shows that cleanliness habits are vital for keeping children healthy. It has been shown that washing your hands with soap can lower the number of infectious diseases, especially diarrhea and infections of the gastrointestinal tract. Chronic intestinal dysfunction can occur when you get infections over and over again. This makes it harder for your body to absorb nutrients and can cause stunting. This study supports the idea that stunting prevention programs should not just focus on addressing dietary needs, but should also involve changes in fundamental hygiene and sanitation habits at the home level. Teaching people how to wash their hands properly, making sure there are enough places to wash their hands, and making the Community-Based Total Sanitation (STBM) program stronger are all key ways to lower the risk of stunting in island areas.

Overall, the findings of this study suggest that handwashing habit is a more critical determinant than the accessibility of home latrines concerning stunting in the Maratua Islands District. Consequently, initiatives to avert stunting must focus on a cohesive promotive and preventive strategy, highlighting modifications in familial health behaviors, enhanced cleanliness standards, and the fortification of targeted and sensitive nutritional interventions.

CONCLUSION

This study found a very high prevalence of stunting in the Maratua Islands District, Berau Regency, where all 54 toddlers in the sample experienced short or very short height status, with a dominant age distribution in the 1-3 years and a gender preponderance of boys. Spearman correlation analysis showed a significant relationship between handwashing behavior and the incidence of stunting ($\rho = 0.350$, $p = 0.009$), while the availability of family latrines was not significant ($\rho = 0.227$, $p = 0.098$), which confirms the crucial role of hand hygiene in preventing recurrent infections that interfere with nutrient absorption. These findings are in line with WASH studies in coastal areas that highlight CTPS behavior as a major risk factor for stunting. The study included a cross-sectional design that only describes associations without causality, a small sample size due to the limited population in the islands, and low data variation due to stunting prevalence approaching 100 percent, potentially affecting statistical power. Suggestions for further research include cohort or intervention designs with larger samples, measurement of latrine quality and confounding factors such as maternal nutritional status, and replication in other islands for generalizability. Practically, these results recommend prioritizing interventions in the promotion of handwashing with soap through community-based STBM programs, strengthening sanitation facilities in remote areas, and integrating with nutritional monitoring during the first 1,000 days of life to sustainably reduce stunting.

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