

The Relationship of Hand Washing Behavior and Type of Latrine with Stunting Incident

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Abstract: Stunting is a linear growth disorder in which a child's body is very short based on height-for-age with a Z-score threshold of < -2 SD. Silalahi sub-district has a stunting prevalence above 30%. Multi-dimensional factors, including environmental factors, cause stunted. Environmental factors that cause stunting are the mother's personal hygiene, sanitation, clean water, and drinking water sources. This study aimed to determine the relationship between washing hands with soap and latrine ownership with stunting in toddlers. Observational study with a case-control design in Silalahisabungan District, Dairi Regency. All stunted toddlers were taken as cases (78), and 78 toddlers were selected as controls, which were selected using systematic random sampling. The study results showed that there were stunting toddlers, namely 84.6% with the behavior of washing hands with soap did not meet the requirements, and 44.9% of toddlers suffering from stunting were in the age range of 21-40 months. Bivariate analysis using the chi-square test showed an effect of Handwashing with Soap ($p=0.002$, $OR=2.727$) and Latrine Ownership ($p=0.001$, $OR=3.048$) on the incidence of stunting in toddlers. Management of stunting events requires good coordination and collaboration between health workers, the government, and the community in reducing risk factors.

Keywords: Latrine; Sanitation; Stunting; Toddlers; Washing hands

Introduction

The health status of the Indonesian nation is measured from several aspects, one of which is children's health. Children are an investment and the next generation for the nation's future progress. The prevalence of stunting worldwide in 2019 was 144 million children (21.3%). The Asian continent has the highest prevalence of stunting worldwide, with 78.2 million children (54%). Southeast Asia is the 2nd Asian continent with the highest prevalence of stunting in children, namely 13.9 million children (24.7%). Indonesia is the third country with the highest prevalence of child stunting in Southeast Asia (27.67%) (Chowdhury et al., 2022; Permanasari et al., 2021; Tamir et al., 2022).

The condition of the prevalence of stunting in North Sumatra (North Sumatra) based on the 2021 Indonesian Nutrition Status Study Data (SSGI) is very concerning (Andreinie et al., 2024; Arlinda et al., 2022; Nasution et al., 2023). 13 out of 33 regencies/cities in North Sumatra have "red" status or have a stunting prevalence above 30%. Mandailing Natal has the highest stunting prevalence of 47.1%. Other red areas are Padang Lawas, Pakpak Bharat, South Nias, North Nias, Dairi, North Padang Lawas, Nias, Padangsidempuan City, Langkat, Batubara, North Labuan Batu and South Tapanuli. Those with yellow status or those with a prevalence of stunting in the range of 20 to 30% include Samosir, Simalungun, West Nias, Labuan Batu, South Labuhan Batu, North Tapanuli, Humbang Hasundutan, Gunung

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Sitoli City, Tanjung Balai City, Sibolga City, Central Tapanuli, Karo, Toba Samosir, and Binjai (Munira, 2022).

Families who have low knowledge will affect daily behavior, including defecation. This low knowledge is caused by the unwillingness of family members to seek information about what they do not know. Disposal of feces is one of the environmental health efforts that must fulfill basic sanitation for every family. Proper disposal of manure must be disposed of in a cesspool called a latrine. Communities with high-income levels will find it easier to build defecation facilities that meet the requirements. In contrast, low-income people will undoubtedly hinder their ability to build defecation facilities (Agustiyaningsih et al., 2020; Aulia et al., 2021; Gargita, 2020; Lutfi et al., 2022).

Washing hands with soap is also known as an effort to prevent disease. This is done because hands are one of the agents that carry germs and cause pathogens to move from one person to another. Concerning Community-Based Total Sanitation, there are critical times when CTPS is needed, namely before eating, before processing and serving food, before breastfeeding, before feeding infants/toddlers, after defecating/urinating, and after handling animals /bird. The Guidelines for Implementing School Environmental Health stipulate that each classroom has a place for washing hands with clean running water in front of the classroom and at least one place for washing hands for two classes (Amar, 2021; Ellis et al., 2020; Rumaolat, 2023).

Handwashing with soap and proper latrine ownership are key components in maintaining personal and environmental hygiene. When these hygiene practices are not done well, the risk of infections such as diarrhea, intestinal worms, and other diseases increases. Recurrent infectious diseases in children can hinder the absorption of nutrients they need for growth, which can ultimately lead to stunting. Without adequate latrines, defecating in the open can contaminate water sources and the surrounding environment, increasing the risk of spreading disease. By improving hygiene practices, the risk of exposure to stunting-causing pathogens can be minimized (Berawi, 2023; Khairun et al., 2023).

Children who are frequently sick due to infections tend to have poor appetite and their body's ability to absorb nutrients is also impaired, which can worsen stunting. Stunting not only affects height, but also brain development, which can affect learning ability, productivity and future health. By understanding the relationship between hand washing with soap, latrine ownership and stunting, more targeted interventions can be designed to prevent these long-term impacts.

Stunted children are more likely to experience difficulties in school and in their working lives as adults,

leading to a cycle of poverty. By researching and addressing factors that contribute to stunting, such as hygiene and sanitation, we can improve children's chances of growing up healthy and productive, which in turn can improve the social and economic well-being of communities.

In-depth research on the relationship between hand washing with soap, latrine ownership, and stunting provides a scientific foundation for effective policies and intervention programs in addressing stunting, thereby improving the quality of life of future generations.

Method

This research is an analytical survey of the risk factors for stunting, namely hand washing with soap (CPTS) behavior and food sanitation hygiene as independent variables and the incidence of stunting in children aged 0-59 months as the dependent variable. The data in this study were analyzed by correlational analysis. The time approach used in this study is case-control. Case-control research is an observational analytic epidemiological study that examines the relationship between specific effects (disease or health conditions) and certain risk factors. The research was carried out in the Silalahi Sabangan District, Dairi Regency. The time of this research was carried out from June - September 2022. The population in this study were all toddlers aged 0-59 months in Silalahi Sabangan District, Dairi Regency, with a total of 453 toddlers. They are stunting toddlers, totaling 78 toddlers.

The sample in this study were toddlers who were stunted and those who were not stunted. Comparison of sample control cases 1:1. All stunted toddlers were taken as cases, and 78 toddlers who were not stunted were selected using systematic random sampling. Data was collected using a questionnaire addressed to the respondent, namely the mother of a stunted toddler, and data on observation of latrine ownership, including data on the characteristics of the respondent, namely name, age, occupational education, and Data the characteristics of the toddler: Age, Gender, Date of Birth, Data on Height (TB) and Latrine Ownership Data. Data on toddlers and toddlers who experience stunting were obtained from the Silalahi Sabangan Health Center. The data collected was analyzed in the form of univariate analysis, such as the frequency distribution of each variable, both independent variables. The research scheme can be seen in the following figure

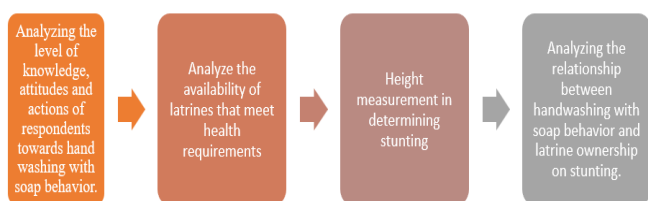


Figure 1. The research scheme

Results and Discussion

Overview of Research Locations

The relationship is a subdistrict in Regency Dairy, ProvinceNorth Sumatra, Indonesia. The district capital is in the village. This sub-district is an expansion of the sub-districtsumbul. Silahisabung is the only sub-district in Dairi Regency, which is on the edge of Lake Toba. Silahisabung District consists of 5 villages namely: Silalahi I Village, Silalahi II Village, Silalahi III Village, Paropo I Village and Paropo II Village. Silahisabung District is 28 Km from the center of Dairi Regency. This sub-district coordinates 2°47'57.4' N - 98°31'03.2' E and an altitude of 1,012 masl with the following area

boundaries: The northNorthside is bordered by Karo Regency. To the south, it is bordered by Sidikalang District; To the east, it is bordered by Lake Toba and to the west by Simalungun Regency.

Population Conditions

According to the Indian Population Census 2020, the population of this sub-district is 5,242, so it is the district with the lowest population in Dairi Regency. Silahisabung is one of the areas of origin of hereditary clans. Soap. The majority of the population of Silahisabung are Toba Batak people who come from the descendants of Silahi Sabungan and other areas around the shores of Lake Toba, such as Samosir, Tongging, and Simalungun.

Based on dataCentral Bureau of StatisticsDairi Regency, as much as 97.88% of the population of Silahisabung Subdistrict adhere to religionChristian(Protestant62.79% and Catholic35.09%). The remaining 2.12% of the population adheres to the religion Islam. This sub-district has seven Protestant churches, 2 Catholic churches, and one mosque.

Table 1. Frequency Distribution of Respondent Characteristics in Silalahisabung District, Dairi Regency in 2022

Characteristics of Respondents	Case		Control	
	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)
Respondent Age:				
16-25 years	22	28.2	29	37.2
26-35 years	41	52.6	33	42.3
36-45 years	15	19.2	16	20.5
46-55 years	0	0	0	0
Respondent Education:				
Never School	11	14.1	8	10.3
Graduated from elementary school	14	17.9	14	17.9
Middle school graduate	21	26.9	18	23.1
Graduated from high school	19	24.4	29	37.2
Graduated Diploma	11	14.1	7	9.0
Graduate	2	2.6	2	2.6
Respondent's Occupation Does not work	9	11.5	11	14.1
Farmers/Laborers/Fishermen	41	52.6	32	41.0
Self-employed	23	29.5	28	35.9
PNS/TNI/Polri	5	6.4	3	3.8
Other	0	0	4	5.1
Household Income				
< Rp. 2,538,345	43	55.1	32	41.0
≥ Rp. 2,538,345	35	44.9	46	59.0
Gender of Toddler Boys	40	51.3	33	42.3
Woman	38	48.7	45	57.7
Toddler Age 0-20 months	30	38.5	15	19.2
21-40 months	35	44.9	38	48.7
41-59 months	13	16.7	25	32.1
Total	78	100	78	100

Table 2. Distribution of Handwashing with Soap Behavior on Stunting Incidents in Silalahisabungan District, Dairi Regency in 2022

Categories	Case		Control	
	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)
Good Knowledge				
Enough	0	0	64	82.1
Not enough	16	20.5	14	17.9
Attitude				
Good	4	5.1	66	84.6
Enough	29	37.2	12	15.4
Not enough	45	57.7	0	0
Good Action				
Enough	8	10.3	68	87.2
Not enough	36	46.2	9	11.5
Incidence of Diarrhea in the Last 3 Months				
There is	34	43.6	1	1.3
There is not any	49	62.8	58	74.4
CTPS behavior	29	37.2	20	25.6
Qualify	12	15.4	58	74.4
Not eligible	66	84.6	20	25.6
Total	78	100	78	100

Table 3. Relationship between Handwashing with Soap and Stunting Incidents in Toddlers in Silalahisabungan District, Dairi Regency in 2022

Behavior CTPS	No stunt		stunt		Amount		p.s value	OR	95 % CI
	N	%	n	%	n	%			
Fulfill Condition	52	33.3	33	21.2	85	54.5	0.002	2,727	1.423
It does not meet the Condition	26	16.7	45	28.8	71	45.5			- 5.228
Total	78	50	78	50	156	100			

Ownership Latrines Against Stunting

Table 4. Frequency Distribution of Healthy Latrine Ownership of Stunting in Silalahisabung District, Dairi Regency in 2022

Latrine Ownership	Case		Control	
	F	%	F	%
Qualify	15	19.2	58	74.4
Not eligible	46	80.8	20	25.6
Total	78	100	78	100

The Table 4 shows that as many as 33.3% of respondents with CTPS behavior met the requirements of having non-stunted toddlers, and 21.2% had stunted toddlers. As many as 16.7% of respondents with CTPS behavior did not meet the requirements of having non-stunted toddlers, and as many as 28.8% of respondents had stunted children. This shows that respondents with CTPS behavior did not meet the requirements of stunting toddlers more in the case group. Respondents with CTPS behavior that did not meet the requirements tended to have stunted toddlers. From the table above, the results of calculating the p-value are 0.002 (0.002 < 0.05), then H_a is accepted (accepts the hypothesis), and

H_0 is rejected (hypothesis is rejected). This shows a significant effect of the CTPS behavior variable on the incidence of stunting in children aged 0 - 59 months in Silalahisabung District, Dairi Regency. This means that CTPS behavior that does not meet the requirements can increase the incidence of stunting in children aged 0-59 months in Silalahisabung District, Dairi Regency, in 2022. The odds ratio obtained from the calculation is 2.727, meaning that CTPS behavior that does not meet the requirements has a 2.727 times greater chance of having a stunted toddler than CTPS behavior that meets the requirements.

The odds ratio is accompanied by the desired confidence interval (CI). This research has a 95% CI. The results of this study obtained a 95% CI 1.423 - 5.228. This means that CTPS behavior that does not meet the requirements can increase the incidence of stunting in children aged 0-59 months in Silalahisabung District, Dairi Regency, in 2022. The odds ratio obtained from the calculation is 2.727, meaning that CTPS behavior that does not meet the requirements has a 2.727 times greater chance of having a stunted toddler than CTPS behavior that meets the requirements. The odds ratio is accompanied by the desired confidence interval (CI).

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Table 5. Relationship between Latrine Ownership and Stunting in Toddlers

Ownership Toilet	No stunt		stunt		Amount		p.s value	OR	95 % CI
	N	%	n	%	N	%			
Fulfill Condition	46	29.5	25	16.0	71	45.5	0.001	3.048	1.582 - 5.870
nope Fulfil Condition	32	20.5	53	34.0	85	54.5			
Total	78	50	78	50	156	100			

The Table 5 shows that 29.5% of respondents with latrine ownership who meet the requirements have non-stunted toddlers, while 16.0% have stunted toddlers. As many as 20.5% of respondents with latrines who did not meet the requirements had children under five who were not stunted, and 31.4% had stunted children. This shows that respondents with latrines who do not meet the requirements and have stunting under five are more in the case group. Respondents with latrines that do not meet the requirements tend to have toddlers who are stunted. The results of statistical analysis obtained a p-value of 0.001 (0.001 < 0.05), then Ha is accepted (accepts the hypothesis), and Ho is rejected (hypothesis is rejected). This shows a significant influence of the variable Latrine Ownership on the incidence of stunting in children aged 6 - 59 months in Silahisabung District, Dairi Regency. This means that owning a latrine that does not meet the requirements can increase the incidence of stunting in children aged 0-59 months in Silahisabung District, Dairi Regency, in 2022.

The Odds Ratio obtained from the calculation is 3,048, which means that those who own a latrine that does not meet the requirements are more likely to have stunted children than those who own a latrine that meets the requirements. The Odd Ratio is accompanied by the desired confidence interval (CI).

Discussion

The research results obtained during the study in Silahisabung District, Dairi Regency, from June to July 2022, included 78 toddlers in the case group and 78 toddlers in the control group. Data analysis was carried out in the case group, which consisted of children aged 0-59 months with stunting, while the control group consisted of children aged 0-59 months who were not stunted. The condition of the prevalence of stunting in North Sumatra (North Sumatra) based on the 2021 Indonesian Nutrition Status Study Data (SSGI) is very concerning. 13 out of 33 regencies/cities in North

Sumatra have "red" status, aka having a stunting prevalence above 30%. Mandailing Natal, with a stunting prevalence of 47.1%, ranks number 2 out of 246 regencies/cities in 12 priority provinces based on SSGI 2021 data (Munira, 2022).

The study results showed that washing hands with soap (CTPS) and owning a latrine were factors associated with stunting. The results of this study are the same as those of a previous study conducted by Dewi (2022), which showed that CTPS behavior significantly influences the incidence of stunting in toddlers aged 24-59 months. This shows that respondents with CTPS behavior who did not meet the requirements had stunted toddlers, while most respondents with CTPS behavior who met the requirements had toddlers who were not stunted.

The chi-square test showed significant results with a p-value of 0.002 for the CTPS Behavior factor and a p-value of 0.001 for Latrine Ownership. This shows that there is a significant effect of the CTPS behavior and latrine ownership variables on the incidence of stunting in children aged 0-59 months, meaning that respondents with CTPS behavior do not meet the requirements and latrine ownership that does not meet the requirements is at risk of causing stunting under-fives. The Odd Ratio obtained from calculations on the CTPS Behavior variable is 2.727, meaning that respondents with CTPS Behavior who do not meet the requirements have a 2.727 times greater chance of having stunted toddlers than respondents with eligible CTPS behavior 3,048 means that respondents with poor latrine ownership practices have a chance 3,048 times more likely to have stunted toddlers than respondents who have latrines that meet the requirements.

These results are consistent with the research by Herawati et al. (2020), which showed that there was a significant relationship between the quality of toilet ownership facilities (p = 0.000; OR 31.875) associated with an increase in stunting in toddlers in the working

area of the Harapan Health Center New Samarinda. Not having a latrine ($p = 0.000$; OR 7.398) is associated with an increase in the incidence of stunting in children under two years old in Central Sulawesi. However, according to Dewi and Rika Gusna (2022), research shows no relationship between ownership of a healthy latrine and the incidence of stunting ($p = 0.0115$, Or 3.398; 95% CI 0.849-18.269).

Lack of cleanliness from water that could be polluted by people who do not have latrines. Then polluted water is used daily, causing infectious diseases such as diarrhea and intestinal worms, so toddlers will experience impaired absorption of nutrients in the digestive process, resulting in weight loss. Infectious diseases last long and often cause toddler stunting (Kemenkes, 2018).

Environmental conditions, namely the lack of access to clean water sanitation facilities that do not meet the requirements, significantly affect the incidence of stunting. An environment that does not meet health requirements causes disease transmission from feces to mouth, resulting in diarrhea, intestinal worms, and environmental enteropathy. Environmental enteropathy is a subclinical disorder condition believed to be caused by repeated intestinal infections, causing chronic problems with nutrient absorption due to changes in the intestinal wall. The infection makes it difficult for the body to absorb nutrients; when the nutritional needs in the body are not met, the energy in the toddler's body must be divided, and the energy that should be used for growth switches to the body's resistance to infection (Al et al., 2021; Novianti & Nurjaman, 2022; Putri et al., 2022; Syaputri et al., 2023; Yenita et al., 2021). Infectious diseases negatively impact growth and nutrition; malnourished children die excessively from these diseases. So that good environmental sanitation conditions can protect children against stunting (Mukaramah & Wahyuni, 2020; Zaheer et al., 2023).

Conclusion

The behavior of washing hands with soap in the category that meets the requirements is mainly owned by respondents with non-stunted toddlers; on the contrary, in the category that does not meet the requirements, most are owned by respondents with stunted toddlers. As many as 33.3% of respondents with CTPS behavior met the requirements of having non-stunted toddlers, and 21.2% had stunted toddlers. As many as 16.7% of respondents with CTPS behavior did not meet the requirements of having non-stunted toddlers, and as many as 28.8% of respondents had stunted children. Most respondents with non-stunted toddlers in the category of Qualified Latrines owned it,

whereas those in the Unqualified category were owned mainly by respondents with stunted toddlers. As many as 29.5% of respondents with latrine ownership who met the requirements had non-stunted toddlers, while 16.0% had stunted toddlers. As many as 20.5% of respondents with latrines who did not meet the requirements had children under five who were not stunted, and 31.4% had stunted children. This shows that respondents with latrines who do not meet the requirements and have stunting under five are more in the case group. Respondents with latrines that do not meet the requirements tend to have stunted toddlers. And the results obtained from the calculation of the p-value of 0.001.

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Author Contributions

The main author Theodorus Teddy Bambang Soedjadi: designing research, conducting research, collecting data, and writing research articles. The second author Deli Syaputri, helped design the research; the third author Samuel Marganda Halomoan Manalu, helped prepare the report and research instruments; and the fourth author Leo Eykel Timanthar, conducted data analysis.

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Conflicts of Interest

The author declares that all authors have no conflict of interest.

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