ASSOCIATIONS BETWEEN LATRINE, CLEAN WATER AVAILABILITY, AND STUNTING IN CHILDREN UNDER FIVE IN BATAM, RIAU ISLAND

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ABSTRACT

Background: Stunting is a global burden affecting nearly 160 million children younger than five years of age. Whilst the linkages between nutrition and stunting are well recognized, there is a need to explore environmental factors such as water and sanitation, which may influence feeding practices and result in potential infection pathways. This study aimed to determine the association of toilets and clean water availability with the incidence of stunting in children under five.
Subjects and Method: This was a cross-sectional study conducted in Galang, Batam, Riau Island, Indonesia, in March 2021. A sample of 82 children under five years was selected randomly. The dependent variable was stunting. The independent variables were the availability of toilets and clean water. The data were collected by questionnaire and observation. The bivariate analysis was performed by Chi-square test.
Results: The risk of stunting reduced with the availability of latrine (OR= 0.09; 95% CI= 0.03 to 0.30; p< 0.001) and clean water (OR= 0.01; 95% CI<0.01 to 0.08; p< 0.001).
Conclusion: The risk of stunting reduces with the availability of latrine and clean water.

Keywords: stunting, availability, toilet, clean water, children under five

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BACKGROUND

Stunting is a state of being short or very short to more than -2 SD below the median length based on height for age. Stunting describes a state of chronic malnutrition and children need time to develop and recover to a state of normal height for their age (Adiyanti, 2014).

The nutritional status of young children is assessed according to 3 indices, namely weight for age (WAZ), height for age, and weight for height (WHZ). Z-score is the deviation value of normal BB or TB according to the growth standard (Briend et al., 2015). Limitations for the category of nutritional status of young children according to the index of WAZ, HAZ, WHZ according to WHO can be seen in Table 1.

Based on the data Riskesdas 2018 showed prevalence stunting in young children in Indonesia large 30.8%, or about 7.8 million young children suffer from stunting. When compared with the 2013 figure of stunting clicking experienceed a decline in 2018. So, the target of Medium Term Development

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Plan National (RPJMN) in 2019 that the number of stunting by 28% in young children has not been reached. In short, the percentage of stunting in Indonesia is still a health problem that must be addressed (Bugis, 2017).

Table 1. Indicators of nutritional status assessment according to WHO

Indicator	Nutritional Status	Z – Score
Weight for age (WAZ)	Malnutrition	< -3.0SD
	Malnutrition	-3.0 SD to < -2.0SD
	Good Nutrition	-2.0 SD to 2.0SD
	More Nutrition	> 2.0SD
Height for age (HAZ)	Very Short	< -3.0SD
	Short	-3.0 SD to < -2.0SD
	Normal	-2.0 SD
Weight for height (WHZ)	Very thin	< -3.0SD
	Thin	-3.0 SD to < -2.0SD
	Normal	-2.0 SD to 2.0SD
	Fat	> 2.0SD

Based on secondary data from Batam city years 20 20, it was found young children who experience stunting at largest in the District Galang. There were 32 children stunting of 679 in young children who measured their height. Digestive infectious disease conditions, especially diarrhea, are still commonly found in the Galang Health Center area, with data obtained from diarrheal diseases of 420 cases of diarrhea in 2018 (Fatmawati, 2017).

Toddlers and children are subjects that are very susceptible to gastrointestinal infections, and poor sanitary environment gives negative impact on children, so it could run into the Environmental Enteropathy (EE). EE causes damage to the protuberances or villi of the large intestine making it difficult to absorb nutrients. It leads to susceptible to chronic diarrhea (Kemenkes RI, 2014).

Good environmental sanitation is one of them having toilets that meet the requirements and the availability of clean water in every home. The toilet ownership's data in Galang sub-district is still below the standard figure of 42.2%.

Toilet requirements that meet the requirements based on the Regulation of the Minister of Health of the Republic of Indonesia No. 3 of 2014 namely : (1) Does not pollute drinking water, the location of the holding hole is at least 10 meters from the supply of clean water or drinking water; (2) It is odorless and feces cannot be contaminated with insects or vectors; (3) Urine does not pollute the surrounding soil; (4) Floor toilet measuring at least 1x1 meters and with a tilted state of drain water; (5) The availability of wall and roof protective watertight; (6) Have adequate lighting; (7) Having adequate ventilation; (8) The availability of water in quantities enough; and (9) Have a septic tank (Kemenkes RI, 2018).

Meanwhile, the availability of clean water is the availability of water that is suitable for cooking, washing, bathing, and even drinking water in accordance with the standards set by the Indonesian Ministry of Health. Clean water and proper sanitation are basic human needs. One of the

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points in the sustainable development goals (SDGs) in the environmental sector is to ensure that people achieve universal access to clean water and sanitation (Manggala et al., 2018). This study aimed to determine the association of toilets and clean water availability with the incidence of stunting in children under five.

SUBJECTS AND METHOD

1. Study Design

This research was an observational quantitative study with a cross-sectional method.

2. Population and Sample

The population in this study was all houses that had young children residing in Galang District, Batam City as many as 679 young children. Technique sample using the formula Slovin ie n = N/1 + N (e) ^{2} and obtained the number of samples as many as 82 study subjects.

3. Study Variables

The dependent variable was latrine and clean water availability. The independent variable was stunting.

4. Operational Definition of Variables

Stunting is a nutritional deficiency in infants in the first 1000 days of life that lasts a long time and causes delays in brain development and child development. Due to chronic malnutrition, stunting babies grow shorter than the standard height of toddlers for their age.

Availability of toilets is a latrine or a place that has facilities for the disposal of feces/feces is one of the factors causing disease transmission because it is related to the transmission of disease from feces.

Availability of clean water is a type of water-based resource that is of good quality and is commonly used by humans for consumption or in carrying out their daily activities, including sanitation.

5. Study Instrument

Data collection procedures carried out by the observation that measure body height of young children with indicators of nutritional status assessment by WHO, and do interview to the mother or parents.

6. Data Analysis

The sample characteristics was shown by univariate analysis in frequency and percentage. The bivariate analysis was done using the chi square test.

The results of this study discussed the indicators in accordance with investigation goal which finding out, namely, the characteristics of the study subjects (aged mother or parents, the characteristics of the child's age, availability of toilets that meet the requirements, the availability of clean water, the incidence of stunting in children young children, and analysis of the availability of toilets that meet the requirements, and the availability of clean water with the incidence of stunting.

RESULTS

A. Sample Characteristics

Table 2 showed that the life of the mother or parents that most are in the 20-35 years age was 72 (86.7 %), as many as 22 has 48-53 months, (26.5%), as many as 35 subjects has toilets that meet the requirements are (42.2 %), as many as 40 subjects (48.2 %) can access clean water, and a few of 32 study subjects has nutritional status

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experienced stunting (-3.0 SD to <-2.0 SD) (38.6 %).

B. Analysis of Toilet Availability with Stunting Incidence

Table 3 showed that efficient analysis of the influence of availability of toilet against the incidence of stunting in young children the majority of children with the nutritional status of normal as many as 31 children (88.6%) to have toilets that qualify and the majority of children with the incidence of stunting (-3.0 SD to <-2.0 SD) as many as 28 children (58.3 %) whose toilet availability status did not meet the requirements. Based on the test results of chi-square on the degree of confidence of 95%, the risk of stunting reduced 0.09 times with the availability of latrine (OR= 0.09; 95% CI= 0.03 to 0.30), and it was statistically significant (p <0.001).

Table 2. Sample Characteristics (categorical data) (n=83)

Variables	Categories	Frequency (n)	Percentage (%)
Age of Mother or Parents (Years)	< 20 years	1	1.2
	20-35 years old	72	86.7
	> 35 years old	10	12.1
Child's Age (months)	24-29	10	12.1
	30-35	11	13.3
	36-41	19	22.9
	42-47	15	18.2
	48-53	22	26.5
	54-59	6	7.0
Availability of latrine	Yes	35	42.2
	No	48	57.8
Availability of clean water	Yes	40	48.2
	No	43	51.8
Nutritional Status of Children aged 24-59 Months	Normal	51	61.4
	Stunted (-3.0 SD to < -2.0 SD)	32	38.6

Table 3. Relation between toilet availability and stunting

Nutritional status	Toilet Availability				OR	95% CI		p
	Qualify		Not Qualify			Lower Limit	Upper Limit	
	N	%	N	%				
Stunting (-3.0 SD to <-2.0 SD)	4	11.4	28	58. 3	0.09	0.03	-0.30	<0.001
Normal	31	88. 6	20	41. 7				

Table 4. Relation between availability of clean water and stunting

Nutritional status	Availability of Clean Water				OR	95% CI		p
	Yes		No			Lower Limit	Upper Limit	
	N	%	N	%				
Stunting (-3.0 SD to <-2.0 SD)	0	0.0	32	74.4	0.01	0.01	0.08	<0.001
Normal	40	100	11	25.6				

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C. Analysis of Clean Water Availability with Stunting Incidence

Table 4 showed that the availability of clean water to the incidence of stunting in young 40 children (100%) to have access to clean water and the majority of children with the incidence of stunting (-3.0 SD up to <-2.0 SD) as many as 32 children (74.4%) with no availability of clean water. The chi-square test showed the risk of stunting reduced 0.01 times with the availability of cleaning water (OR= 0.01; 95% CI <0.01 to 0.08), and it was statistically significant (p<0.001).

DISCUSSION

Provision of toilets that meet the requirements and availability of clean water are actions that are closely related to meeting nutritional needs and the incidence of diarrhea (KIA Gizi, 2018). The type of place to dispose of clean feces and the availability of clean water for activities, especially after defecating, after disposing of children's feces, before feeding children and after eating will shorten the chain of disease transmission (Leroy et al., 2019)

The nutritional status of children is one indicator of a child's health. Normally a healthy child with increasing age also gains weight and height accompanied by good growth and development according to his age. The general rule in measuring nutritional status is to use standard anthropometric parameters (Sjarif et al., 2019).

The results of statistical data analysis showed that there was an influence between the availability of toilets and the incidence of stunting in young children in Bulang District, Batam City, the results showed that the p< 0.001 with the results of field observations that there were still many subjects who used latrines with direct feces disposal into land and to sea water. This condition can cause diarrheal diseases and the incidence of stunting in children. The impact of continuous diarrhea can result in children's growth being not optimal and will cause children to become stunted (Kemenkes RI, 2017).

This is similar to previous research. The results of the analysis showed that there was a significant relationship between the type of latrine used and the incidence of stunting. Types of latrines that are not appropriate (not goose-neck) have a tendency to suffer from stunting 1.3 times higher than children who have proper latrines (Spears et al., 2013). Other research of Fatmawati, 2017 also showed the result that there is a relationship between the use of clean water, the use of healthy latrines and hand wash using soap in cases of illnesses infections, especially diarrhea (Stanton, 2005).

In addition to the availability of toilet eligible, events stunting is also heavily influenced by the availability of clean water, and this is similar to the previous study by Magar et al. in Nawalparasi (Nepal) showed that there was a significant relationship between the availability of clean water and washing hands before/after doing activities with the incidence of diarrhea in children under five (Vilcins, 2018) .

This study concluded that there is relationship between the availability of eligible toilet and the availability of clean water on reducing the inci-

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dence stunting in children in Bulang subdistrict, Batam City.

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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