

Relationship of Access to Clean Water with Prevalence of Stunting in Puskesmas Cicalengka in 2020

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Abstract

Bandung Regency was ranked the 4th highest in terms of the prevalence of stunting in West Java Province. District of Cicalengka was ranked as the 6th highest in terms of the prevalence of stunting in Bandung Regency as much as 33,7%. These numbers did not reach the World Health Organization (WHO) target, which is to reduce stunting numbers to less than 20%. It also did not reach the Bandung Regency Strategic Plan 2016-2021 target to reduce stunting prevalence to less than 14 %. Stunting was considered to be related to access to clean water. The aim of this study was to measure the relationship between access to clear water and the prevalence of stunting in Puskesmas Cicalengka in 2020. This study was analytic research using a cross-sectional design. Data that was used in this research was data of height per age in children under five years and data of access to clean water. Data were extracted from the annual report of Puskesmas Cicalengka 2020. The number of the subject which appropriate with the inclusion criteria was 5.179. The sampling technique used in this study was the whole sampling. Data were analyzed using univariate analysis to describe the characteristic of subjects and chi-square test to measure the relationship between the two variables using software statistical product and service solution (SPSS) for windows version 18.0. Chi-square test reveals that the p-value is lower than 0,05 (p=0.000). It can be concluded that access to clean water is related to the prevalence of stunting. Improved collaboration between environmental health programs and maternal and child health programs in Puskesmas Cicalengka is needed to find the solution.

Keywords: *Access, clean water, Puskesmas Cicalengka, sanitation, stunting*



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INTRODUCTION

Stunting is chronic linear growth failure in children under five years, which is characterized by body height or length according to age below -2 (minus two) standard deviations (World Health Organization, 2020; United Nations Children's Fund, 2019). Linear growth in children is an indicator of nutritional status to assess children's health (World Health Organization, 2018).

Stunting is one of major public health problems throughout the world, including Indonesia (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2019). The prevalence of stunting worldwide in 2019 was 144 million or 21.3% (WHO, 2020). The prevalence of stunting in Indonesia was the third highest in the region of Southeast Asia (27.67%). West Java Province had a prevalence of stunting as much as 31.2 %, which is the 24th highest out of 33 provinces in Indonesia (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2019).

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Bandung Regency was ranked the 4th highest in terms of the prevalence of stunting in West Java Province. The prevalence was 35.2 % (Pemerintah Kabupaten Bandung, 2019). District of Cicalengka was ranked as the 6th highest in terms of the prevalence of stunting in Bandung Regency, as much as 33,7% (Pemerintah Kabupaten Bandung, 2019; Puskesmas Cicalengka, 2020). These numbers did not reach the World Health Organization (WHO) target, which is to reduce stunting numbers to less than 20%. It also did not reach the Bandung Regency Strategic Plan 2016-2021 target to reduce stunting prevalence to less than 14 %; thus, the Regency Government decided to choose stunting as one of the top priorities problems to be solved (World Health Organization, 2018; Pemerintah Kabupaten Bandung, 2019)

Stunting can cause serious impact and damage on the quality of human resources because it can lead to the decrease of health status (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2019). Determinants of stunting can be in two, direct and indirect. Examples of direct factors are the nutritional intake from food and supplement and infection. Example of indirect factors are sanitation and hygiene, food endurance, and the parenting style (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2019; Izwardi, 2020)

The coverage of access to clean water in the Public Health Centre or Pusat Kesehatan Masyarakat (Puskesmas) Cicalengka in 2020 was only 16.5%, while the target was 80%. This gap is thought to be related to the prevalence of stunting there (Puskesmas Cicalengka, 2020). The aim of this study was to measure the relationship between access to clean water and the prevalence of stunting in Puskesmas Cicalengka in 2020.

LITERATURE REVIEW

Stunting is a condition of chronic nutritional deficiency that occurs during the critical period of growth and development since fetal. Stunting is defined as a condition in under five years children, in which the body length or height is under minus two standard deviations of the WHO median standard. Stunting occurs from pre-conception when a female teenager becomes a malnourished and anemic mother. It becomes worse when she is pregnant with inadequate nutritional intake. It gets worsens when this mother lives in an environment with inadequate sanitation during pregnancy or after giving birth (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2019).

Clean water is a part of adequate sanitation. Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 492 the Year 2010 concerning the requirements for drinking water quality, healthy drinking water is safe if it meets all the requirements, which are physical, microbiological, chemical, and radioactive (Kementerian Kesehatan Republik Indonesia, 2010). The easiest parameters commonly used are to see the good physical quality of water, not cloudy, tasteless, odorless, and colorless.

A systematic review study conducted by Olo, Mediani, and Rakhmawati showed that water factors such as unimproved water and drinking water treatment related to the incidence of stunting in Indonesia. The study was reviewed 21 articles. It showed that unimproved water comes from an unimproved source or the water source is too near from latrine or unstandardized water treatment before consumed by children. This kind of water contains pathogen microorganisms and or other chemical material which can cause diarrhea in children. If this constipation continues for more than two weeks, it will interfere with nutritional absorption then lead to stunting (Olo et al., 2021)

Another study by Hasan and Kadarusman showed that access to clean water and poor sanitation facilities could increase the incidence of infectious diseases, which can divert energy for growth to the body's resistance to infection. Nutrients are difficult to absorb by the body and stunted growth. Maintenance of

clean water sources that meet health requirements in households is proven to reduce the risk of diarrheal disease between 30-40 times (Hasan & Kadarusman, 2019).

RESEARCH METHODOLOGY

This study was analytic research using a cross-sectional design. Data that was used in this research was data of height per age in children under five years and data of access to clean water. Data were extracted from the annual report of Puskesmas Cicalengka 2020. Children who have chronic infections such as tuberculosis and chronic non-infectious diseases were excluded.

The number of children under five years in the annual report was 6.187 of data child. Among this total number, there were 122 children who have a history of tuberculosis, 14 children who have leukemia, and 872 children with no data of access to clean water. Thus, the number of subjects that appropriate with the inclusion criteria was 5.179. The sampling technique used in this study was the whole sampling. Data were analyzed using univariate analysis to describe the characteristic of subjects and chi-square test to measure the relationship between the two variables. Tools which was used to calculate the data were software statistical product and service solution (SPSS) for windows version 18.0. Results of the study are presented in the form of a table.

FINDINGS AND DISCUSSION

Table 1 below summarizes the characteristics of subjects. Basically, the majority of the children under five were age 25-29 months. Most of them were male, did not suffer stunting, and have access to clean water.

Table 1. Characteristics of Children Under Five Years in Puskesmas Cicalengka

Characteristics	Frequency (n = 5.179)	Percentage (%)
Age (months)		
0-6	585	11.3
7-11	715	13.8
12-24	1.413	27.3
25-59	2.466	47.6
Gender		
Male	2,667	51.5
Female	2,512	48.5
Stunting		
Yes	1,718	33.2
No	3,461	66.8
Access to clean water		
Accessible	3.386	65.4
Non accessible	1,793	34.6

The relationship between access to clean water and the prevalence of stunting in children under five years is summarized in Table 2. Chi-square test reveals that the p-value is lower than 0,05 ($p=0.000$). It can be concluded that access to clean water is related to the prevalence of stunting.

Table 2. Relationship of Access to Clean Water with Prevalence of Stunting

Access to clean water	Stunting				Total	%	P-value *
	Yes	%	No	%			
Not accessible	1,228	23.7	565	10.9	1,793	34.6	0.000
Accessible	490	9.5	2,869	55.9	3,386	65.4	
Total	1,718	33.2	3,461	66.8	5,179	100	

Test chi square $\alpha = 0.05$

Table 1 showed that the proportion of stunting by age difference in Puskesmas Cicalengka had an increase in number with the majority was 25-29 months old. This result is in accordance with research conducted by Gebersessie et al. in Ethiopia. The research was cross-sectional and collected from 1,287 children under five years old, which also showed that there was an elevation in the prevalence of stunting in children (Geberselassie et al., 2018)

Access to clean water is one of the indicators of environmental sanitation in Puskesmas Cicalengka that did not reach the target and had the lowest coverage. Children under five years who did not have access to clean water were still relatively low compared to the target; thus, the coverage was still less than 80% (Puskesmas Cicalengka, 2020). The results of the chi-square test revealed that access to clean water is related to stunting with p lower than 0,005 ($p=0.000$). The study by Abate et al. on 2,733 children showed that there was a significant relationship between unclean water to the incidence of stunting ($p = 0.01$; $p < 0.05$). Unclean water can increase the risk of stunting 3.2 times (OR: 3.2; 95% CI: 1.2–8.4) (Abate et al., 2020).

Clean water is considered as human rights and facility to be beneficial in daily needs such as drink, food preparation, or bath and cleaning. Unclean water, in reverse, can harm the human body and cause infection such as diarrhea (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2019; Rianto & Nefilinda, 2018). The previous study held by Mirsiyanto et al. to 135 children indicated there was a significant relationship between unclean water with repetitive diarrhea ($p = 0.007$; $p < 0.05$) (Mirsiyanto et al., 2020). Another study by Krisnana et al. showed a significant relationship between unclean water and the incidence of diarrhea ($p = 0.001$; $p < 0.05$). Unclean water can increase the risk of diarrhea by as much as 4,1 times (Krisnana et al., 2020).

Repetitive diarrhea, especially in children, can cause enteropathy, which interferes with the absorption of nutrients that is important for growth, and in the end, lead to the incidence of stunting (Chen et al., 2020; Sarma et al., 2017). A study by Wirth et al. on 320 children under five years old (128 cases and 192 controls) showed there was a significant relationship between the incidence of repetitive diarrhea to enteropathy ($p < 0.05$). Children who suffered enteropathy had the risk of stunting 1.4 times (OR: 1.4; 95% CI: 0.6–3.5) (Wirth et al., 2019). Another study by Amadi et al. on 5,660 children showed that children with stunting suffered villi mucosal intestinal injury (Amadi et al., 2021). This injury can cause chronic inflammation, thus damage the enterocytes cell and lead to the decrease in enzyme-linked to brush border membrane cells such as maltase, folate hydrolase, and angiotensin-converting enzyme (Amadi, 2021). These conditions interfere with nutrients absorption for growth and development in children (Sedek & Pyrzak, 2020)

This research has proven that health was determined by a healthy environment. In this case, collaboration, particularly between environmental health programs and maternal and child health programs in Puskesmas Cicalengka, is needed to find the solution. Puskesmas also need to reach stakeholders to participate in order to improve access to clean water. The limitation of this study was using

secondary data. Further research must be done to collect primary data; thus, the confidence of the evidence can be elevated. It is also important to classify the source of clean water and unclean water that was used by the children's families to achieve a comprehensive assessment.

CONCLUSION AND FURTHER RESEARCH

Stunting mostly happens in children who can not access clean water. Clean water is needed to reduce the possibility of stunting. Improved collaboration between environmental health programs and maternal and child health programs in Puskesmas Cicalengka is needed to find the solution. Further research should be done by collecting primary data and classify the source of the clean water to achieve comprehensive assessment.

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