ORIGINAL ARTICLE

Association Between Toilet Availability and Handwashing Habits and the Incidence of Stunting in Young Children in Tanjung Pinang City, Indonesia

Ahmadi[1], Lilis Sulistyorini[2], R. Azizah[2], Hengky Oktarizal[3]

[1] Master Program in Environmental Health, Faculty of Public Health, Airlangga University, Surabaya, Indonesia
[2] Department of Environmental Health, Faculty of Public Health, Airlangga University, Surabaya, Indonesia
[3] Faculty of Health Sciences, Ibnu Sina University, Batam, Indonesia

ABSTRACT

Introduction: Stunting is a short or very short body state that exceeds -2 SD (Standard Deviation) below the median length based on height by age. The purpose of this study was to determine the effect of the availability of toilets meeting the requirements and habits of washing hands with soap on the incidence of stunting in children aged 24-59 months in Bugis Village in Tanjung Pinang City. **Method:** This study was observational with a cross-sectional approach. The procedure of data analysis was done by quantitative analysis. Large sample of 82 children aged 24-59 months.. The sampling technique uses simple random sampling. Data collection uses observation and interviews. Statistical tests using the test Chi-square. **Results:** the study showed that there is an association between stunting in children and the availability of toilets meeting hygiene requirements (p-value= 0.016) and handwashing habit with soap (p-value= 0.013). **Conclusion:** the incidence of stunting in children aged 24-59 months in Bugis Village Tanjungpinang City is influenced by the availability of qualified toilets in each house and the habit of washing hands with soap.

Keywords: Handwashing habits, Stunting, Toilet availability

Corresponding Author:
Lilis Sulistyorini, Ir., M.Kes
Email: l.sulistyorini@fkm.unair.ac.id
Tel: +62816512940

INTRODUCTION

Stunting is a short or very short body state that exceeds -2 SD below the median length based on height by age. Stunting illustrates a chronic state of malnutrition and the child needs time to develop and recover back to a normal child's height according to his age (1,2). Height Body according to age to Body Height according to age is assessed according to 3 indices, Body Weight by Age (BB/U), Height Body according to Age, Weight according to Height (BB/TB). Z-score is the normal BB or TB deviation value according to the growth standard (3). Limits for the category of Height Body according to age to Body Height according to age according to the index BB/U,TB/U,BB/TB according to WHO can be seen in Table I (3).

Based on Riskesdas data in 2018 showed the prevalence of stunting in children under five in Indonesia by 30.8% or about 7.8 million children under five suffering from stunting. The prevalence of stunting in Indonesia has decreased in 2018 compared to 2013, with a prevalence percentage of 37.2% consisting of 18.0% very short and 19.2% short. So, the target of the National Medium Term Development Plan (RPJMN) in 2019, namely the number of stunting of 28% in infants has not been reached. So the percentage of stunting in Indonesia is still a health problem that must be addressed (1,4).

Based on secondary data from Tanjung Pinang City

Table I: Indicator for Nutritional Status Assessment by WHO

INDICATORS	NUTRITIONAL OF STATUS	Z - SCORE
Weight by age (BB/U)	Malnutrition	< -3,0 SD
	Underweight Nutrition	-3.0 SD to < -2.0 SD
	Good Nutrition	-2, 0 SD to 2.0 SD
	Over Nutrition	> 2.0 SD
Height by Age (TB/U)	Very Short	< -3.0 SD
	Short	-3.0 SD to < -2.0 SD
	Normal	≥-2, 0 elementary
Weight Body according to Height (BB/TB)	Very Thin	< -3.0 SD
	Thin	-3.0 SD to < -2.0 SD
	Normal	-2.0 SD to 2.0 SD
	Fat	> 2.0 SD

Abbreviation: BB/U = body weight / age; TB/U = body height / age; BB/TB = body weight/ body height

in 2018, it was found that toddlers who experienced the most severe stunting were from the Bugis Village Community Health Center, whereby 131 toddlers out of 448 children aged 24-59 months had growth stunting. The condition of digestive infections, especially diarrhea, is still commonly found in the area of the Kampung Bugis Community Health Center, with diarrheal data obtained by 528 cases of diarrhea in 2018 (5,6).

Toddlers and children are subjects who are very susceptible to digestive infections, poor environmental sanitation has a negative impact on children, so they can experience Environmental Enteropathy (EE). EE causes damage to the colon or villous large intestine making it difficult to absorb nutrients. Then, chronic diarrhea is prone to occur (7).

Availability of toilet in every home that meets good hygiene requirements and the habit of washing hands with soap are two core good environmental sanitation practices. Data on the availability of toilets in the Bugis village area shows that it is below the standard rate of 54.82%. In addition to the influence availability of quantified toilet and hand washing habits, the incidence of stunting can also be caused by the availibility of clean water, parents' education level, and family incomes. For adequate standards of hygiene, toilets need to meet the requirements established by the Republic of Indonesia Minister of Health Regulation No. 3 of 2014. These requirements are as follows: 1). Do not pollute drinking water, the location of the reservoir hole must be at least 10 meters from the provision of clean water or drinking water, 2). Drinking water must be odourless, and cannot be contaminated with faeces, insects or vectors, 3). Urine does not pollute the surrounding soil, 4). The toilet floor size is at least 1x1 meter and with a sloping state of water removal, 5). Availability of waterproof walls and protective roofs, 6). Has adequate lighting, 7). Has sufficient air ventilation, 8). Availability of sufficient amounts of water, and 9). Having a septic tank (9,10).

The habit of washing hands with soap is a good measure of sanitation as cleaning hands and fingers using water and soap breaks the chain of microbial transmission. Washing hands with soap is well-recognised as an effort to prevent disease. This is because the hands are often agents by which microbes and pathogens are transferred from one person to another either by direct or indirect contact (11–13). Hands that come in direct contact with human or animal faeces or other body fluids that are contaminated can transfer bacteria, viruses, and parasites to others who might not be aware that these organisms are being transmitted (4,10).

MATERIALS AND METHODS

This research is a quantitative observational cross-sectional study to assess the association between specific factors and growth stunting in children in Indonesia (14) by assessing the relationship between the availability of quantified toilets and the habit of washing hands with soap in the event of stunting in children. The data collection procedure was carried out by observation, which included measuring the height of children aged 24-59 months, nutritional status assessment based on WHO guidelines, and conducting interviews with parents or guardians. The study population were children aged 24-59 months who lived in the Bugis village in Tanjung Pinang city (N= 448). Determination of the sample using the Slovin formula that is $n = N / 1 + N (e)^2$ and obtained a sample size of 82 respondents. The time-frame of study is March until August 2019. Data obtained through interviews and observations are then processed using a computer, presented in tabular form and analyzed with the test chi-square.

RESULTS

In the study results, we assessed the characteristics of the respondents including the age of the parent or guardian, the child's age, the availability of toilets that meet hygiene and sanitation requirements, and the habit of washing hands with soap with the incidence of stunting in children under 24-59 months. We performed analysis of toilet availability that met hygiene and sanitation requirements, and the habits of washing hands with soap comparing children who had growth stunting with those who did not have stunting of growth.

Characteristics Of The Respondents

Table II shows that the majority of the parents or guardians are between 20-35 years of age (n=69 [84.15%]) and the mode for age group of the children in the study are those 48-53 months of age (n=19 [23.2%]). It also shows that 58 people (70.7%) had access to toilets that met the

Table II: Characteristics of the respondents (N = 82)

Factor	Frequency	%
Age of Mother or Parent (year)		
<20 years	1	1.22
20-35 years	69	84.15
> 35 years	12	14.63
Age of Children (months)		
24-29	13	15.9
30-35	9	11.0
36-41	18	22.0
42-47	16	19.5
48-53	19	23.2
54-59	7	8.5
Availability of Quantified Toilet		
Yes	58	70.7
No	24	29.3
Hand Washing Habits		
Yes	65	79.3
No	17	20.7
Nutritional Status of Children aged 24-59 Months		
Normal	54	65.9
Stunting (-3.0 SD to <-2.0 SD)	28	34.1

hygiene requirements, and 65 persons (79.3%) had the habit of washing hands with soap. For growth stunting based on nutritional status (-3.0 SD to <-2.0 SD), 28 children fulfilled the criteria, giving a growth stunting prevalence of 34.1%.

Analysis effect Availability Qualified of Toilet On The Incidence Stunting

Table III shows that the results of analysis on the effect of toilet availability on the prevalence of stunting in children aged 24-59 months. The majority of children who had access to toilets that meet hygiene and sanitation requirements had normal growth (n=53 [91.4%]). On the other hand, only 5 (8.6%) of the children with adequate or qualified toilets had growth stunting. Of the children with growth stunting, 23 (95.8%) did not have access to a toilet that met hygiene and sanitation standards. Based on chi-squared test set at a 95% confidence level, there is a significant association between the availability of toilets that met hygiene and sanitation standards and growth stunting in children (p=0.016)

Table III: Distribution Analysis Availability Qualified of Toilet on the incidence of stunting

Nutritional Status	Availability Qualified of Toilet				Total		p-value
	Yes		No				
	N	%	N	%	N	%	
Stunting (-3.0 SD to <-2.0 SD)	5	8.6	23	95.8	28	34.1	0.016
Normal	53	91.4	1	4.2	54	65.9	
Total	58	100	24	100	82	100	

Analysis of Habits Handwashing with Soap On The Incidence Stunting

Table IV shows that analysis of the association between habit of washing hands with soap to the prevalence of stunting in children aged 24-59 months. In those who practiced the habit of washing hands with soap, and majority of children had normal growth (n=52 [80.0%]). In those who did not have the habit of washing their hands with soap, a significant proportion had growth stunting (n=15 [88.2%]). Based on chi-squared test set at a 95% confidence level, there is a significant association between the habit of washing hands with soap and growth stunting in children (p=0.013).

Table IV: Distribution Analysis of Habits Handwashing with Soap on the incidence of stunting

Nutritional Status	The Habits Handwashing with Soap				Total		p-value
	Yes		No				
	N	%	N	%	N	%	
Stunting (-3.0 SD to <-2.0 SD)	13	20.0	15	88.2	28	34.2	0.013
Normal	52	80.0	2	11.8	54	65.8	
Total	65	100	17	100	82	100	

DISCUSSION

The provision of toilets that meet the requirements and habit of washing hands with soap is an action that is closely related to meeting nutritional needs and the incidence of diarrhea (7,15). Types of clean stool disposal and the habit of washing hands with soap, especially after defecating, after disposing of children's feces, before feeding the child and after eating will shorten the chain of disease transmission (2,7,11).

Children's nutritional status is one indicator of a child's health. Normally a healthy child with increasing age also gains weight and height accompanied by growth and development that is good according to his age. General provisions in measuring nutritional status are using anthropometric standard parameters (3,6,16).

The results of data analysis in this study show that there is a statistically significant association between the availability of toilets meeting hygiene and sanitation requirements and growth stunting in children aged 24-59 months in the Bugis Village at Tanjung Pinang city. One of the possibilities for this association is that non-adequate toilets lead to discharge of faecal contaminants directly into the ground and into seawater. This could then lead to frequent diarrhoeal illness that could contribute to growth stunting in these children. The impact of recurrent diarrhoeal illnesses have been reported to affect optimal child growth and result in children who have stunting of growth (7,8). This is similar to previous research reporting a significant relationship between the types of latrines used and growth stunting in children. Inappropriate types of latrines (not goosenecks) have a tendency to be associated with stunting at a rate 1.3 times higher compared to children who have proper latrines (8,17). Another study from Fatmawatim et al. in 2017 also showed that there was a relationship between the use of clean water, the use of healthy latrines and the behaviour of washing hands with soap with cases of infectious diseases, especially diarrhoea (18).

In addition to the availability of qualified toilets, the incidence of stunting is also strongly influenced by the habit of washing hands with soap. This is similar to the results of a previous study by Magar, et al. in Nepal that showed a significant relationship between handwashing with soap before/after activities with the incidence of diarrhoea in infants (19). Hands that contain microbes if not cleaned properly can be a medium for the entry of microbial organisms into the human body, either through direct contact with the mouth or contact with food and drink. This is a route leading to gastrointestinal infections, which then affects the absorption of nutrients, thus resulting eventually in toddlers who are prone to stunting (6,20,21).

CONCLUSION

The findings of this study indicates that there is a statistically significant association (0.016) between the availability of toilets meeting hygiene and sanitation standards and growth stunting in Indonesian toddlers in Tanjung Pinang city. There is also a statistically significant relationship (p=0.013) between the habit of parents or guardians washing their hands with soap and stunting of growth in these children.

ACKNOWLEDGEMENTS

The author would like to thank the respondents, field workers, research fellow Dr. Lilis Sulistiyorini has helped in the preparation of the paper, as well as Dr. R. Azizah and Mr. Hengky Oktarizal, MKM have helped support managing data and design methodology, local authorities who are involved in this research.

REFERENCES

1. Kementerian Kesehatan RI. Stunting report. Kementeri Kesehat RI. 2018;1:2.
2. Manggala AK, Kenwa KWM, Kenwa MML, Sakti AAGDPJ, Sawitri AAS. Risk factors of stunting in children aged 24-59 months. Paediatr Indones. 2018;58(5):205–12.
3. Stanton. C, Hobcraft. J HK. World Bank, UNICEF Estimates of Maternal Mortality in 2005. Bull World Heal Organ. 2005;79:657–64.
4. Kemenkes RI. Buletin Jendela Data dan Informasi Kesehatan Situasi Diare di Indonesia. J Bul Jendela Data Inf Kesehat. 2011;2:1–44.
5. Bugis PK. Profil Kesehatan Puskesmas Kampung Bugis Kota Tanjungpinang Tahun 2017. Tanjungpinang; 2017.
6. Program Kesehatan Keluarga Seksi Kesehatan Ibu Anak dan Keluarga Berencana. Laporan Program Gizi. Tanjungpinang; 2018.
7. Vilcins D, Sly PD, Jagals P. Environmental risk factors associated with child stunting: A systematic review of the literature. Ann Glob Heal. 2018;84(4):551–62.
8. Adiyanti M. Pola Asuh Gizi, Sanitasi Lingkungan, dan Pemanfaatan Posyandu dengan Kejadian Stunting Pada Baduta di Indonesia (Analisis Data Riskesdas Tahun 2010). Jakarta; 2014.
9. Kementerian Kesehatan RI. Sanitasi Total Berbasis Masyarakat. Peraturan Menteri Kesehatan Republik Indonesia Nomor 3 Tahun 2014 2014 p. 1–2.
10. Spears D, Ghosh A, Cumming O. Open Defecation and Childhood Stunting in India: An Ecological Analysis of New Data from 112 Districts. PLoS One. 2013;8(9):1–9.
11. Lestari S, Fujiati II, Keumalasari D, Daulay M. The prevalence and risk factors of stunting among primary school children in North Sumatera, Indonesia. IOP Conf Ser Earth Environ Sci. 2018;125(1).
12. Briend A, Khara T, Dolan C. Wasting and stunting-similarities and differences: Policy and programmatic implications. Food Nutr Bull. 2015;36(1):S15–23.
13. Sjarif DR, Yuliarti K, Iskandar WJ. Daily consumption of growing-up milk is associated with less stunting among indonesian toddlers. Med J Indones. 2019;28(1):70–6.
14. Notoatmodjo S. Metodelogi Penelitian Kesehatan. Jakarta: Rineka cipta; 2002.
15. Notoatmodjo S. Ilmu kesehatan masyarakat. Jakarta: Rineka cipta; 2003.
16. Indriani D, Dewi YLR, Murti B, Qadrijati I. Prenatal Factors Associated with the Risk of Stunting: A Multilevel Analysis Evidence from Nganjuk, East Java. J Matern Child Heal. 2018;03(04):294–300.
17. Leroy JL, Frongillo EA. Perspective: What Does Stunting Really Mean? A Critical Review of the Evidence. Adv Nutr. 2019;10(2):196–204.
18. Fatmawati, Arbianingsih M. Faktor yang Mempengaruhi Kejadian Diare Anak Usia 3-6 Tahun di TK Raudhatul Athfal Alauddin Makassar. Jounal Islam Nurs. 2017;1(1):21–32.
19. Kumari B, Magar P, Kaphle HP, Gupta N. Open Defecation Free (ODF) Status of Magdi District of Nepal after Three Years of Declaration : A Cross-Sectional Study. Int J Heal Sci Res. 2016;6(September):351–5.
20. Ariati NN, Fetria A, Purnamawati AAP, Suarni NN, Padmiari IAE, Sugiani PPS. Description of nutritional status and the incidence of stunting children in early childhood education programs in Bali-Indonesia. Bali Med J. 2018;7(3):723–6.
21. Beal T, Tumilowicz A, Sutrisna A, Izwardy D, Neufeld LM. A review of child stunting determinants in Indonesia. Matern Child Nutr. 2018;14(4):1–10.