Indonesian Journal of Global Health Research
Volume 6 Number 2, April 2024
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

THE CORRELATION OF ENVIRONMENTAL SANITATION WITH STUNTING INCIDENTS IN SCHOOL-AGE CHILDREN

Rini Ernawati*, Misbah Nurjanah, Tri Wahyuni
D3 Nursing Study Program, Universitas Muhammadiyah Kalimantan Timur, Jl. Ir. H. Juanda no.15 Samarinda, Kalimantan Timur 75122, Indonesia
*re840@umkt.ac.id

ABSTRACT
Stunting in children can be caused by direct and indirect factors, such as environmental sanitation factors. Children who live in an unhealthy environment are prone to illness, which will interfere with growth in children and can lead to stunting. This study aims to determine the relationship between environmental sanitation factors (drinking water sources, latrines, waste disposal, garbage disposal, healthy homes, and air pollution) with the incidence of stunting in school-age children at SD Loa Janan Ilir District, Samarinda City. The research method used an analytic survey with a cross-sectional approach, with a sample of 188 respondents, consisting of parents and first graders from 5 elementary schools. The instruments used were microtoise and questionnaires. Data analysis using chi-square. The results showed that the source of drinking water was p = 0.000, the toilet variable was p = 0.000, the waste disposal variable was p 0.020, the garbage disposal variable was p = 0.000, the healthy house variable was p = 0.003 and the air pollution variable was p = 0.000. All variables have a p-value <0.05, so Ho is rejected, meaning that the variable sources of drinking water, latrines, waste disposal, housing conditions, air pollution are all related to the incidence of stunting in school children. Improving environmental sanitation that meets health requirements is crucial to preventing stunting in school-age children.

Keywords: environmental sanitation; stunting; school children

First Received	Revised	Accepted
19 January 2024	28 January 2024	31 January 2024
Final Proof Received		**Published**
06 March 2024		01 April 2024

How to cite (in APA style)
Ernawati, R., Nurjanah, M., & Wahyuni, T. (2024). The Correlation of Environmental Sanitation with Stunting Incidents in School-Age Children. Indonesian Journal of Global Health Research, 6(2), 553-564. Retrieved from https://jurnal.globalhealthsciencegroup.com/index.php/IJGHR/article/view/2994.

INTRODUCTION

Stunting is a chronic nutritional disorder that occurs in children, and also focuses on pregnant women with nutritional disorders (Cumming & Cairncross, 2016), and occurs almost all over the world, especially in Asia and Africa. Stunting in school-aged children occurs due to a long process of malnutrition that occurs during the previous growth and development process. Indonesia is a developing country that has complex problems in terms of nutrition. Millions of children and teenagers in Indonesia are threatened by several nutritional problems, namely the high number of children who are short (stunting) and thin children (wasting) as well as the double burden of malnutrition, namely the problems of malnutrition and excess nutrition (Warganegara & Nur, 2016). The problem of malnutrition that has recently received a lot of attention from the government is stunting. Stunting is defined as a height index for age (TB/U) between -3 SD to <-2 SD (Kementerian Kesehatan RI, 2017).

Data showed that the prevalence of stunting in Indonesia in 2021 was 24.4% and decreased in 2022 to 21.6, however this figure is still above the standard set by WHO which sets a minimum standard of 20%, so it is still a special concern for the government to continue strives to reduce it to reach the target of 14% by 2024 (Kementerian Kesehatan Republik Indonesia, 2022). East Kalimantan Province is one of the provinces that has a stunting incidence rate of 29.24%, and Samarinda is one of the municipalities that has a fairly high stunting rate, namely 26.26%. This shows that stunting cases are still above WHO standards and this should be a serious concern for the local government to try to reduce it to below 20%. (Kemenkes RI, 2018).

Chronic malnutrition can be caused by various causes, both direct and indirect. Direct factors include the nutrition of pregnant women, nutrition of toddlers, infectious diseases, while indirect causes can come from various environmental aspects, namely, sources of drinking water and adequate sanitation. (Astuti, 2022). Waste disposal and rubbish disposal also play an important role in the incidence of stunting (Hasanah et al., 2021). The condition of house floors and air pollution are also associated with acute respiratory infections and chronic diseases, so in the long term this can cause stunting and pneumonia in children. (Sudaryanto et al., 2020). Childhood is a period of growth and development that does not yet have a perfect immune system, making children more susceptible to disease, especially infectious diseases such as diarrhea and ARI. This disease can originate from environmental problems around the child's life. Poor environmental sanitation can be the main cause of disease in children, including the use of unclean drinking water sources, waste disposal, rubbish dumps, latrines, which do not meet health requirements. Based on research, poor waste and rubbish disposal is associated with stunting in toddlers. with p value = 0.000 (Yuliani Soeracmad, 2019).

Children who often suffer from illness can have their growth disrupted, because when they are sick the child does not want to eat so nutritional intake is reduced. If a child is often sick it can cause chronic nutritional disorders which have an impact on the incidence of stunting in children. The research (Himawati & Fitria, 2020), shows that Acute Respiratory Infection disease is correlated with the incidence of stunting in toddlers with the result p=,0.029. Another disease that can also contribute to stunting is diarrhea , research from (Taliwongso et al., 2017), stated that diarrheal disease is also related to the incidence of stunting in school children with a value of p = 0.032. The condition of the disease will get worse if the child's nutritional status is lacking/poor, because this will cause a decrease in the body's immunity. Low immunity causes the ability to defend oneself against infection attacks to decrease. Infectious diseases associated with poor environmental sanitation conditions are ARI and diarrhea. Based on research, diarrhea is associated with the incidence of stunting with p = 0.000. (Wulandari et al., 2019). This study aims to determine the relationship between environmental sanitation and the incidence of stunting in school-aged children at the Loa Janan Ilir District Elementary School, Samarinda City.

METHOD

This research uses an observational analytical survey with a cross sectional approach. The research was conducted from March to May 2023, in 5 elementary schools (SD), namely (SD 008,009, 010, MI Ar Rohmah, and DDI Tani Aman) in Loa Janan Ilir District, Samarinda City. The research sample was 188 parents and First grade students taken based on inclusion and exclusion criteria. The sampling technique uses total sampling. The research instruments were a microtoise height measuring tool and a questionnaire containing the characteristics of the respondents and environmental sanitation. The questionnaires have been tested for

validity, 45 questionnaires were declared valid with a constant value greater than 0.6, and a reliability test of 0.79. The data analysis used was the Chi – Square test.

RESULTS

Table 1.
Distribution of respondent

Characteritics	Categori	f	%
Mother's age	Late Teenager (17-25)	4	2,1
	Early Adulthood (26-35)	86	45,7
	Late Adulthood (36-45)	83	44,1
	Early edelry (46-55)	15	7,9
Mother's occupation	Government employees	3	1,6
	Private employee	60	31,9
	Housewife	99	52,6
	Self-employed	26	13,8
Mother's Education	No school	1	0,5
	Elementary	16	8,5
	Junior High School	38	20,2
	Senior High School	108	57,4
	University	25	13,3
Child's gender	Male	96	51,1
	Female	92	48,9
Child's age	6 years old	29	15,4
	7 years old	153	81,4
	8 years old	6	3,2

Table 1 shows that the majority of mothers' ages are in the adult category aged 26 to 45 years as many as 169 people (89.8%). The most dominant occupation of mothers is housewife, numbering 99 people (52.6%). Most mothers' education was a high school diploma or equivalent, 108 people (57.4%). The gender of 96 children was male (51.1%) and the maximum age was 7 years, amounting to 153 people (81.4%).

Table 2.
Environmental sanitation variables in Loa Janan Ilir District, Samarinda

Variable	Category	f	%
Water condition	Unhealth	29	15,4
	Healthy	159	84,6
Toilet	Unhealth	37	19,7
	Healthy	151	80,3
Disposal	Unhealth	40	21,3
	Healthy	148	78,7
Rubbish	Unhealth	70	37,2
	Healthy	118	62,8
House condition	Unhealth	50	26,6
	Healthy	138	73,4
Air condition	Unhealth	65	34,6
	Healthy	123	65,4
Stunting incident	Stunting	64	34,1
	Not stunting	124	65,9

Table 2 shows that families of Loa Janan Ilir District Elementary School students use unhealthy clean water sources 29 (15.4%) and healthy water sources 159 (84.6%). Ownership of healthy toilets was 151 (80.3%) and unhealthy ones were 37 (19.7%). Healthy waste disposal was 148 (78.7%) and unhealthy waste was 40 (21.3%). Healthy waste disposal was 118 (62.8%) and unhealthy waste was 70 (37.2%). 138 (73.4%) had healthy house conditions, 50 (26.6%) were

unhealthy. healthy air 123 (65.4%) unhealthy 65 (34.6%). And the incidence of stunting was 64 children (34.1%) and 124 (65.9%) were not stunted.

Table 3.
Analysis of the Relationship between Environmental Sanitation and Stunting Incidents In School Age Children

Variable	Stunting Incidents						
	Stunting		Not Stunting		Total		P value
	f	%	f	%	f	%	
Water Source							
Unhealthy	26	89,7	3	10,3	29	100	0,000
Healthy	38	23,9	121	76,1	159	100	OR.27,596
Toilet							
Unhealthy	30	81,1	7	18,9	37	100	0,000
Healthy	34	22,5	117	77,5	151	100	OR 14,748
Waste Disposal (PAL)							
Unhealthy	33	81,5	7	17,5	40	100	0,020
Healthy	31	20,9	117	79,1	148	100	OR 17,793
Rubbish disposal							
Unhealthy	39	55,7	31	44,3	70	100	0,000
Healthy	25	21,2	93	78,8	118	100	OR 4,680
House Condition							
Unhealthy	26	52,0	24	48,0	50	100	0,003
Healthy	38	27,5	100	72,5	138	100	OR 2,851
Air condition							
Unhealthy	47	72,3	18	27,7	65	100	0,000
Healthy	17	13,8	106	86,2	123	100	OR 16,281
Total	64	34,0	124	66,0	188	100	

Table 3 shows that the results of the bivariate test for unhealthy water supply were 26 stunted children (89.7%) and 3 children who were not stunted (10.3%). For the provision of healthy water, 121 children were found who were not stunted (76.1%) and 38 (23.9%) who suffered from stunting. The chi square test obtained p= 0.000, meaning that there is a relationship between the provision of clean water and the incidence of stunting in school children at the Loa Janan Ilir District Elementary School, Samarinda City. With an OR of 27.596, this explains that unhealthy drinking water sources have 27.596 times the potential for stunting in children. The majority used healthy latrines as many as 151 and there were 34 stunting (22.5%) and 121 (76.1%) who were not stunting. For unhealthy latrines, there were 30 stunting (81.1%) and 7 not stunting (18.9%). The chi square test results are p = 0.000, meaning that the availability of toilets is related to the incidence of stunting in children, and OR 14.748, meaning that the availability of unhealthy toilets has a 14.748-fold potential for stunting in children.

Healthy waste water disposal (PAL) was 148 and there were 31 stunted children (20.9%) and 117 non-stunting children (79.1%), while in unhealthy PAL there were 33 stunted children (81.5%) and not stunted 7 (17.5%). The results of the bivariate test with chi-square, p-value = 0.020, meaning that there is a relationship between PAL and the incidence of stunting in school children, with an OR of 17.793. Which means that unhealthy waste disposal has a 17,793 times greater potential for stunting in school children. In unhealthy waste disposal, there were 39 stunting (55.7%) and 31 (44.3%) in unhealthy waste disposal. For healthy waste disposal, there were 25 (21.2%) stunted children and 93 (78.8%) children who were not stunted. The results of the chi-square test, p-value=0.000, were significant There is a relationship between waste disposal and the incidence of stunting in school children, with an OR of 4.680, meaning that unhealthy waste disposal has a 4.680 times greater chance of stunting in school children.

In unhealthy housing conditions, there were 26 (52.0%) stunted children and 24 (48.0%) children who were not stunted. In healthy home conditions, there were 38 (27.5%) stunted children and 100 (72.5%) who were not stunted. The results of the bivariate test using chi square, p-value = 0.003, show that there is a relationship between housing conditions and the incidence of stunting in school children, with an OR of 2.851, meaning that an unhealthy house has 2.851 times the potential for stunting in school children. In unhealthy air conditions, 47 (72.3%) children were stunted and 18 (27.7%) were not stunted. Meanwhile, in healthy air there were 17 (13.8%) stunted children and 106 (86.2%) non-stunting children. The results of the chi square test, p-value = 0.000, means that there is a relationship between air conditions and the incidence of stunting in school children, with an OR of 16.261, namely unhealthy air has a 16.261 times greater chance of stunting occurring in school children in Loa Janan Ilir District, Samarinda City.

DISCUSSION

The Relationship between Clean Water and Stunting Incidents in School-Age Children

A source of clean, healthy water is a primary human need, so it is very important for families to provide a source of clean water for their families. Drinking water sources must meet physical, microbiological, chemical and radioactive requirements. The parameters used are tasteless, odorless, colorless.

Based on the results of observations that researchers have made, there are still many people who use river water as a source for daily activities, this is because the environmental conditions where most people live are on the banks of the Mahakam river, so people are very used to it and prefer to use river water. for daily activities and needs, such as bathing, washing, toileting. People think that river water is safe to use for daily needs. In reality, untreated river water certainly does not meet health requirements, because it contains many bacteria that cause disease, especially diarrhea. Based on research (Adriany et al., 2021),states that water sources are correlated with the incidence of stunting with a p value = 0.000. Study (Syafitri et al., 2017) stated that the density of the number of coli bacteria in the Jawi River was related to the incidence of diarrhea p = 0.004, this can be concluded that river water contains a lot of bacteria, especially coliform which is the bacteria that causes diarrhea, if people use river water that contains bacteria every day, it is certainly very dangerous for health. especially the health of children who are still in the process of growth and development. If a child often suffers from diarrhea, it will take time to return to health. During illness, the child experiences a lack of appetite, so the child does not consume food properly, then the child's body's nutritional needs are not met, this will cause growth and development disorders. Study from (Nurmainah et al., 2016) states that children suffering from diarrhea are treated for an average of 3-5 days, thus if the child does not want to eat during the illness, then during the illness process the child's growth will be greatly disrupted, due to a lack of nutritional intake which the child really needs in the process of growth and development, and if the condition If the illness lasts for a long time, it will cause stunting in children. So providing clean water is very important, research (Nisa et al., 2021) stated that the provision of clean water is related to the incidence of stunting in children under five, p=0.047. It requires understanding and awareness among the public that river water should not be used for cooking, bathing, washing, if it is to be used for bathing and washing, it should be treated first by filtering the water, so it is necessary to learn how to filter water.

The Relationship between Latrine Availability and Stunting Incidents in School-Age Children

A healthy waste disposal site or latrine is one that meets health requirements so that it does not cause the spread of human waste and prevents vectors from carrying disease from the waste to the surrounding environment. Latrines that do not meet health requirements, especially those that do not have an adequate drainage system, can cause drinking water pollution. If the water used for drinking, washing food or bathing is contaminated by human feces that are not properly managed, children can be exposed to disease-causing pathogens such as bacteria, viruses and parasites, this can be a cause of child morbidity and mortality. Based on research (Fibrianti et al., 2021),The use of toilets is related to the incidence of stunting with a value of p = 0.026, this research is supported by (Zahrawani et al., 2022) that there is a relationship between the condition of the toilet and the incidence of stunting in children with a value of p = 0.000.

Based on observations, there are still many residents who use open latrines on the river, so that the river water is contaminated with feces, which is very dangerous for the health of residents on the riverbank, especially children, because children bathe and swim in the river every day. River water full of pathogenic bacteria is very dangerous for children's health, because some of the river water is drunk when children swim. Apart from spreading disease through water contamination, disease can also spread through flies and insects, because latrines that are not covered and do not have an adequate drainage system can become nests for flies and other insects. Microorganisms can easily be transported by insects and spread them into food or drink, so that if contaminated food is eaten by children it will cause diseases such as diarrhea, cholera, Acute Respiratory Infection, etc.

It is said in research that the use of unhealthy latrines is correlated with the incidence of diarrhea p = 0.014 (Rohmah & Syahrul, 2017), this is support by research from (Katiandagho & Darwel, 2019) that toilet that do not meet health requirements are related to the incidence of diarrhea in children under five, p = 0.001. Study from (Choiroh et al., 2020) stated that the duration of diarrhea is related to stunting in children, p = 0.030, this states that the longer you suffer from diarrhea, the greater the risk of stunting, because it disrupts nutritional intake which affects the child's growth and development.

The Relationship between Waste Water Disposal and Stunting Incidents in School-Age Children.

Waste water is water that has been contaminated with various substances produced by human activities, especially households, which contain many dangerous substances, both organic and inorganic. If waste water is not managed and treated properly, it can pollute water sources, threaten the quality of drinking water and damage water ecosystems, potentially causing various diseases and health problems. Research explains that waste disposal that is not managed properly can cause stunting with a value of p = 0.003 (Mayasari et al., 2022).

Waste that is disposed of carelessly can pollute the environment both directly and indirectly. Liquid waste that is dumped into waters without proper processing can pollute water sources including rivers. This will threaten the water ecosystem and reduce the quality of drinking water. Waste can also pollute ground water and contaminate ground water sources (wells). Any waste disposed of must comply with environmental ministry regulations (Menteri Kesehatan Republik Indonesia, 2017) that before disposal, every household must have an IPAL that meets health requirements, so that it does not pollute the environment and cause disease, especially in children. Based on research (Mia et al., 2021) data was obtained that

careless wastewater disposal was associated with the incidence of stunting among toddlers in Kurma Village, p=0.023. This is supported by research (Hasanah et al., 2021) that of the 20 articles reviewed stated that waste water management is related to the incidence of stunting in toddlers.

Contaminated waste can cause disease in children due to exposure to dangerous chemicals and pathogenic microorganisms contained in the waste. Children are creatures who are very vulnerable to all kinds of dangerous materials, both organic and inorganic. Children do not yet have a fully developed immune system, so they are easily attacked by various diseases in their environment, including waste. Waste pollution can cause problems. digestive, skin, hormonal disorders and developmental disorders, therefore protecting children from exposure to waste is very important, namely through safe waste management that meets health requirements (closed). Study (Mariana et al., 2021),stated that waste water drainage channels that do not meet health requirements have a big influence on the incidence of stunting with a p value = 0.041.

The Relationship between Garbage Disposal and Stunting Incidents in School-Age Children

Waste is material or goods resulting from human activities that have no economic value or are no longer wanted by the owner. Waste can be solid, liquid or gas, it can take the form of food scraps, paper, plastic, metal, glass etc. Waste comes from various sectors and the most common is household waste. Garbage is often considered an environmental problem that can damage the ecosystem and threaten human health, especially children, because when children are still growing, they are easily susceptible to disease. So good waste management is very important in every household, so that the environment is kept clean. Research shows that people who do not use waste management well have a 71.7% incidence of stunting and those who use waste management well have a lower incidence of stunting in toddlers, namely 43.4% (Sasmita et al., 2022). Waste management includes activities starting from collection, sorting, transportation, processing, recycling and disposal in a safe manner and in accordance with environmental principles. Poor environmental sanitation has an impact on the incidence of stunting in toddlers ,(Aisah et al., 2019).

The bad impact of poor environmental sanitation on the growth and development of toddlers is that toddlers increasingly suffer from infectious diseases such as diarrhea, acute respiratory infections, skin diseases, etc. Children who suffer from infectious diseases cause them not to feel hungry and not want to eat. Infectious diseases also use up calories and protein to fight disease. So that the energy for growth is reduced, the child experiences growth disorders. Children who experience infectious diseases will experience a decrease in the absorption of nutrients needed by the body to repair damaged cells, form new cells and energy sources are not available adequately. Study (Junanda et al., 2022) stated that poor waste management is highly correlated with the incidence of stunting among toddlers in the Wonorejo area. P=0.000. Poor waste sanitation has a big impact on the health of the people around the environment, so public awareness is needed to manage waste properly and correctly, so that the environment is kept clean, and avoids infectious diseases caused by unhealthy waste sanitation. Efforts to maintain environmental cleanliness by changing clean and healthy living behavior (Kusuma, et al, 2022).

Home Conditions with Stunting Incidents in School Age Children

Healthy home conditions include cleanliness, ventilation, lighting and flooring. The condition of house floors made of earth is not good for health because they tend to be damp, research

shows (Lestari & Siwiendrayanti, 2021) stated that earthen floors in houses contribute to the occurrence of diarrhea in children and are also related to the incidence of stunting in children with p=0.007. House cleanliness is very important to maintain the health of household residents, especially children. Adequate ventilation can help reduce humidity and prevent the growth of mold and mites, house dust, eliminate unpleasant odors. Windows must be able to be opened to let fresh air flow into the house and regulate lighting so that it is not damp. Humid air in the house can become a breeding ground for disease. The physical condition of a house that does not meet health requirements carries an 8.83 times risk of stunting in toddlers (Christine et al., 2022).

The physical condition of the house, such as the type of floor and walls, also contributes to the incidence of stunting in children, especially floors made of dirt (Novianti, 2020) . Based on researchers' observations, there are still many residents whose houses are made of boards, both floors and walls, and the position of the house is on the river bank, so the atmosphere in the house tends to be damp. If the floor of a house is made of planks, if it is often damp and cleanliness is not maintained from residual dust and food waste, then this can be a source of fungal or bacterial microorganisms that cause disease, especially diseases that affect the digestive system and respiratory system. Wood chips that are starting to crack can also become a nest for house dust mites which can cause disease or allergies in humans. Study(Anjani Saputri et al., 2022) ,stated that residence was related to the incidence of diarrhea in toddlers. So healthy home conditions are very necessary in caring for children, so that they can grow and develop well and healthily.

Air Pollution with Stunting Incidents in School-Age Children

Air pollution is the presence of harmful substances in the atmosphere that pollute the air we breathe. Air pollution can come from various sources such as burning rubbish, vehicle exhaust, industrial waste, etc. The dangerous substances contained in air pollution can have a negative impact on human health, especially children, because children are creatures who are very vulnerable to various unhealthy changes in the surrounding environment. Long-term exposure to pollutants can cause respiratory tract infections, inflammation and diseases such as Acute Respiratory Infection, asthma, bronchitis, and even lung cancer. Children who are frequently exposed to air pollutants will be susceptible to respiratory infections. Study (Setiyo et al., 2019) stated that upper respiratory tract infections were associated with stunting in under-aged children in Pekalongan City. OR 7.01, meaning that children who suffer from Acute Respiratory Infection have a 7.01 times higher risk of stunting. There needs to be an air pollution control program so that pneumonia in children decreases so that stunting rates are also expected to decrease (Sudaryanto et al., 2020)

Air pollution can affect children's immune systems, harmful substances will disrupt children's body's defense mechanisms, and make children more susceptible to respiratory infections, allergies and other diseases. Study Subroto et al., (2021) states that a history of infectious diseases is associated with the incidence of stunting with p=0.000, meaning that children who suffer from infectious diseases have the potential to experience stunting. Powered by (Bahri et al., 2021) that air pollution can cause pneumonia and other health problems in children. Air pollution is an environmental problem that can also affect children's physical and cognitive development. Long-term exposure can disrupt children's nervous systems through inflammation and oxidative stress which can result in neurodegenerative disorders, namely cognitive problems and decreased cognitive function. Prolonged exposure can also disrupt the blood-brain barrier and brain homeostasis, disrupting various functions of the brain's nervous system and causing mental disorders, especially in children because their central nervous

system is still developing. (Supriyanto, 2014). Other research shows that environmental sanitation is related to the incidence of stunting at p=0.000 (Jayanti et al., 2022), and children who are stunted experience obstacles in their development (Syahruddin et al., 2022).

CONCLUSION

Environmental sanitation contributes to the incidence of stunting in school-aged children. The research results show that environmental sanitation, which includes the availability of clean water, ownership of toilets, waste disposal, rubbish disposal, house conditions, and air pollution are factors that are strongly related to the incidence of stunting in school-age children in Loa Janan Ilir District, Samarinda. To overcome stunting in children, a holistic approach is needed. Starting in the womb until toddler age so that children have good immunity and children are not easily attacked by infectious diseases as well as improving sanitation facilities in the environment where children live. This shows that the availability of environmental sanitation that meets health requirements is a very important factor to pay attention to in maintaining and caring for children who are still in their growth and development period, so that children grow into healthy children, according to their age.

REFERENCES

Adriany, F., Hayana, H., Nurhapipa, N., Septiani, W., & Sari, N. P. (2021). Hubungan Sanitasi Lingkungan dan Pengetahuan dengan Kejadian Stunting pada Balita di Wilayah Puskesmas Rambah. Jurnal Kesehatan Global. https://doi.org/10.33085/jkg.v4i1.4767

Aisah, S., Ngaisyah, R. D., & Rahmuniyati, M. E. (2019). Personal Hygiene Dan Sanitasi Lingkungan Berhubungan dengan Kejadian Stunting di Desa Wukirsari Kecamatan Cangkringan. Prosiding Seminar Nasional Multidisiplin Ilmu.

Anjani Saputri, Usman, & Ayu Dwi Putri Rusman. (2022). Analisis Sosial Ekonomi Dengan Kejadian Stunting Di Daerah Dataran Tinggi Kota Parepare. Jurnal Ilmiah Manusia Dan Kesehatan. https://doi.org/10.31850/makes.v5i1.749

Astuti, Y. R. (2022). Pengaruh Sanitasi dan Air Minum Terhadap Stunting di Papua dan Papua Barat. Poltekita : Jurnal Ilmu Kesehatan. https://doi.org/10.33860/jik.v16i3.1470

Bahri, B., Raharjo, M., & Suhartono, S. (2021). Dampak Polusi Udara Dalam Ruangan Pada Kejadian Kasus Pneumonia: Sebuah Review. Link. https://doi.org/10.31983/link.v17i2.6833

Choiroh, Z. M., Windari, E. N., & Proborini, A. (2020). Hubungan antara Frekuensi dan Durasi Diare dengan Kejadian Stunting pada Balita Usia 24-36 Bulan di Desa Kedungrejo Kecamatan Pakis. Journal of Issues in Midwifery. https://doi.org/10.21776/ub.joim.2020.004.03.4

Christine, C., Politon, F. V. M., & Hafid, F. (2022). Sanitasi rumah dan stunting di Wilayah Kerja Puskesmas Labuan Kabupaten Donggala. AcTion: Aceh Nutrition Journal. https://doi.org/10.30867/action.v7i2.536

Cumming, O., & Cairncross, S. (2016). Can water, sanitation and hygiene help eliminate stunting? Current evidence and policy implications. Maternal and Child Nutrition, 12, 91–105. https://doi.org/10.1111/mcn.12258

Erik Kusuma, Ayu Dewi Nastiti, R.A. Helda Puspitasari, D. H. (2022). Edukasi melalui buklet sehat untuk meningkatkan perilaku Hidup bersih dan sehat (PHBS) pada

Masyarakat Pesisir Kota Pasuruan. https://doi.org/https://doi.org/10.32583/keperawatan.v14i4.474

Fibrianti, E. A., Thohari, I., & Marlik, M. (2021). Hubungan Sarana Sanitasi Dasar dengan Kejadian Stunting di Puseksmas Loceret, Nganjuk. Jurnal Kesehatan. https://doi.org/10.32763/juke.v14i2.339

Hasanah, S., Handayani, S., & Wilti, I. R. (2021). Hubungan Sanitasi Lingkungan Dengan Kejadian Stunting Pada Balita di Indonesia (Studi Literatur). Jurnal Keselamatan Kesehatan Kerja Dan Lingkungan. https://doi.org/10.25077/jk3l.2.2.83-94.2021

Himawati, E. H., & Fitria, L. (2020). Hubungan Infeksi Saluran Pernapasan Atas dengan Kejadian Stunting pada Anak Usia di Bawah 5 Tahun di Sampang. Jurnal Kesehatan Masyarakat Indonesia. https://doi.org/10.26714/jkmi.15.1.2020.1-5

Jayanti, N., Irianto, S. E., Kustiani, A., Rahayu, D., & Adyas, A. (2022). Determinan Kejadian Stunting di Wilayah Kerja Dinas Kesehatan Kabupaten Lampung Utara. Poltekita : Jurnal Ilmu Kesehatan. https://doi.org/10.33860/jik.v16i3.1460

Junanda, S. D., Yuliawati, R., Rachman, A., Pramaningsih, V., & Putra, R. (2022). Hubungan Antara Pengelolaan Sampah Rumah Tangga Dengan Risiko Kejadian Stunting Pada Balita Di Puskesmas Wonorejo Samarinda Tahun 2022. Jurnal Kesehatan. https://doi.org/10.23917/jk.v15i2.19824

Katiandagho, D., & Darwel, D. (2019). Hubungan Penyediaan Air Bersih dan Jamban Keluarga Dengan Kejadian Diare Pada Balita Di Desa Mala Kecamatan Manganitu Tahun 2015. Jurnal Sehat Mandiri. https://doi.org/10.33761/jsm.v14i2.118

Kemenkes RI. (2018). Hasil Riset Kesehatan Dasar Tahun 2018. In Kementrian Kesehatan RI (Vol. 53, Issue 9).

Kementerian Kesehatan Republik Indonesia. (2022). Buku Saku Hasil Studi Status Gizi Indonesia (SSGI) Tahun 2022. In Kemenkes RI.

Kementerian Kesehatan RI. (2017). Buku Saku Pemantauan Status Gizi. In D. KesMasy (Ed.), Buku Saku. Kemenkes RI.

Lestari, M. E. P., & Siwiendrayanti, A. (2021). Kontribusi Kondisi Fisik Lingkungan Rumah dengan Kejadian Diare dan Hubungannya terhadap Kejadian Stunting. Indonesian Journal of Public Health and Nutrition.

Mariana, R., Nuryani, D. D., & ... (2021). Hubungan sanitasi dasar dengan kejadian stunting di wilayah kerja puskesmas Yosomulyo kecamatan Metro pusat kota Metro tahun 2021. JOURNAL OF Community ….

Mayasari, E., Sari, F. E., & Yulyani, V. (2022). Hubungan Air dan Sanitasi dengan Kejadian Stunting di Wilayah Kerja UPT Puskesmas Candipuro Kabupaten Lampung Selatan Tahun 2021. Indonesian Journal of Helath and Medical.

Menteri Kesehatan Republik Indonesia. (2017). Peraturan Menteri Kesehatan Republik Indonesia Nomor 32 Tahun 2017 Tentang Standar Baku Mutu Kesehatan Lingkungan Dan Persyaratan Kesehatan Air Untuk Keperluan Higiene Sanitasi, Kolam Renang, Solus Per Aqua dan Pemandian Umum. In Peraturan Menteri kesehatan Republik Indonesia.

Mia, H., Sukmawati, S., & Abidin, U. wusqa A. (2021). Hubungan Hygiene Dan Sanitasi Lingkungan Terhadap Kejadian Stunting Pada Balita Di Desa Kurma. Journal Peqguruang: Conference Series. https://doi.org/10.35329/jp.v3i2.2553

Nisa, S. K., Lustiyati, E. D., & Fitriani, A. (2021). Sanitasi Penyediaan Air Bersih dengan Kejadian Stunting pada Balita. Jurnal Penelitian Dan Pengembangan Kesehatan Masyarakat Indonesia. https://doi.org/10.15294/jppkmi.v2i1.47243

Novianti, S. (2020). Hubungan Faktor Lingkungan Dan Perilaku Dengan Kejadian Stunting Pada Balita : Scoping Review. Jurnal Kesehatan Komunitas Indonesia.

Nurmainah, Susanti, R., & Nansy, E. (2016). Gambaran Biaya dan Lama Rawat Inap pada Pasien Diare Akut Anak yang Menggunakan Kombinasi Suplemen Zink-Probiotik. Jurnal Farmasi Indonesia.

Rohmah, N., & Syahrul, F. (2017). Relationship Between Hand-washing Habit and Toilet Use with Diarrhea Incidence in Children Under Five Years. Jurnal Berkala Epidemiologi. https://doi.org/10.20473/jbe.v5i12017.95-106

Sasmita, H., Sapriana, S., & Bernike Magdalena Sitorus, S. (2022). Hubungan Pemanfaatan Sarana Sanitasi Terhadap Kejadian Stunting Tahun 2021. Poltekita : Jurnal Ilmu Kesehatan. https://doi.org/10.33860/jik.v16i1.753

Setiyo, T., Ani, Y., Nuryanto, M., Science, N., & Program, S. (2019). Faktor Risiko Kejadian Stunting Anak Usia 1-2 Tahun Di Daerah Rob Kota Pekalongan Risk Factor for Stunting Among 1-2 Years Children in Tidal Area Pekalongan City. Jurnal Riset Gizi.

Subroto, T., Novikasari, L., & Setiawati, S. (2021). Hubungan Riwayat Penyakit Infeksi Dengan Kejadian Stunting Pada Anak Usia 12-59 Bulan. Jurnal Kebidanan Malahayati. https://doi.org/10.33024/jkm.v7i2.4140

Sudaryanto, S., Prasetyawati, N. D., Sinaga, E., & Muslikah. (2020). Socialization of the Impact of Air Pollution on Health Disorders Comfort and the Environment. Socialitation of the Impact of Air Pollution on Health Disorders Comfort and Tha Environment.

Supriyanto, I. (2014). Ganggguan Kognitif akibat Polusi Udara Ancaman bagi Generasi Mendatang.

Syafitri, L., Rahmawati, R., & Fitria, L. (2017). Insidensi Penyakit Diare Berdasarkan Kepadatan Bakteri Coliform Di Sungai Jawi, Kota Pontianak. Jurnal Teknologi Lingkungan Lahan Basah. https://doi.org/10.26418/jtllb.v5i1.18538

Syahruddin, A. N., Ningsih, N. A., & Menge, F. (2022). Hubungan Kejadian Stunting dengan Perkembangan Anak Usia 6-23 Bulan. Poltekita : Jurnal Ilmu Kesehatan. https://doi.org/10.33860/jik.v15i4.733

Taliwongso, F. C., Manoppo, J. I. C., & Umboh, A. (2017). Hubungan Stunting dengan Angka Kejadian Diare pada Siswa Sekolah Dasar di Kecamatan Tikala Manado. E-CliniC. https://doi.org/10.35790/ecl.5.2.2017.18526

Warganegara, E., & Nur, N. N. (2016). Faktor Risiko Perilaku Penyakit Tidak Menular. Majority, 5(2), 88–94.

Wulandari, W. W., Rahayu, F., & . D. (2019). Hubungan Sanitasi Lingkungan Dan Riwayat Penyakit Infeksi Dengan Kejadian Stunting Di Wilayah Kerja Puskesmas Kerkap Kabupaten Bengkulu Utara Tahun 2019. Avicenna: Jurnal Ilmiah. https://doi.org/10.36085/avicenna.v14i02.374

Yuliani Soeracmad, Y. S. (2019). Hubungan Sanitasi Lingkungan Rumah Tangga Dengan Kejadian Stunting Pada Anak Balita Di Puskesmas Wonomulyo Kabupaten polewali Mandar Tahun 2019. J-KESMAS: Jurnal Kesehatan Masyarakat. https://doi.org/10.35329/jkesmas.v5i2.519

Zahrawani, T. F., Nurhayati, E., & Fadillah, Y. (2022). Hubungan Kondisi Jamban Dengan Kejadian Stunting Di Puskesmas CicalengkaTahun 2020. Jurnal Integrasi Kesehatan & Sains. https://doi.org/10.29313/jiks.v4i1.7770

Yanti Sitorus, N., DIII Kebidanan, P., Flora Medan, Stik., Kunci, K., masase, M., Persalinan, N., & Kala, I. I. (2021). JURNAL ABDIMAS FLORA LPPM-Sekolah Tinggi Ilmu Kesehatan Flora Pendidikan Kesehatan Tentang Massage Pada Ibu Hamil Dan Bersalin Untuk Mengurangi Nyeri Tahun 2021.