The Correlation of Environmental Sanitation and Diarrhoea Prevalence in Toddlers at Puskesmas Bantul I

Monicha Resma[1]*, Masta Hutasoit[2]
[1,2]Nursing Study Program, Faculty of Health, Jenderal Achmad Yani University Yogyakarta, Indonesia
*Corresponding author: resmamonicha@gmail.com

ABSTRACT

Background: Diarrhea remains the second leading cause of death in toddlers. The causes of diarrhea in toddlers are diverse, including poor environmental sanitation. Poor sanitation that leads to diarrhea includes the lack of clean water facilities, high population density, unavailability of toilets, and other factors that cause environmental pollution.

Purpose: It aims to determine the correlation between environmental sanitation and diarrhoea prevalence in toddlers in Puskesmas Bantul 1.

Methods: The research was descriptive-analytic using a cross-sectional design. The population was 981 toddlers counted from the data from January until March 2024, and the sample was 98 respondents was purposive sampling. The research was conducted in Puskesmas Bantul 1 area from February until July 2024. The data analysis of bivariate used lambda symmetric. Data collection tools used environmental sanitation questionnaires and diarrhea incidence questionnaires.

Results: From the 98 respondents, the highest category of environment sanitation was the qualified as many as 75.5% and the unqualified as many as 24.5%. The most diarrhoea prevalence was 54.1% and non-diarrhoea was 45.9%. The result of the lambda symmetric test was a p-value of <0,001.

Conclusion: There was a strong correlation between environmental sanitation and diarrhoea prevalence in toddlers in Puskesmas Bantul 1. It is hoped that people can pay attention to the provision of clean water sources at least for daily usage and consumption.

Keywords: *Diarrhoea; Environment sanitation; Toddlers*

INTRODUCTION

Diarrhea is defined as a condition in which a person has more than three bowel movements a day with soft or even liquid stool consistency, with or without the presence of blood and mucus, lasting for up to two weeks or longer (Ministry of Health of the Republic of Indonesia, 2023).

Diarrhea is commonly experienced by toddlers. A toddler is a child under the age of 5 years, or a child between 12 and 59 months (Ministry of Health, 2023). Toddlers are more susceptible to diarrhea because they are highly vulnerable to the transmission of diseases in their environment, as their lives are still dependent on their parents.

According to the WHO (2024), the factors that cause diarrhea include infections caused by bacteria, viruses, and parasites, malnutrition, lack of clean water, and other causes that are transmitted through people, as well as poor personal hygiene. Sugiharto (2019)

stated that diarrhea can occur due to environmental factors such as the lack of clean water facilities, high population density, the unavailability of toilets, lack of waste disposal facilities, and improper waste management, leading to environmental pollution.

The incidence of diarrhea in the Bantul 1 Community Health Center area was 15 cases in 2021, which increased to 23 cases or about 0.08% in 2022. In 2023, the incidence of diarrhea rose again to 31 cases, or around 0.31%. The increasing prevalence of diarrhea each year has mostly affected children under the age of 5.

One of the ways to prevent diarrhea is by using clean water for cooking and washing, maintaining proper sanitation, keeping the house clean, and ensuring good environmental hygiene. Environmental sanitation refers to activities aimed at creating a clean community environment in accordance with public health standards, improving, and maintaining healthy living conditions. Sanitation is beneficial for creating a comfortable and healthy environment, enabling people to achieve optimal health and avoid infectious diseases caused by air pollution, dirty and unpleasant-smelling environments, and environmental contamination (BKKBN, 2022).

According to the Central Statistics Agency (BPS), in 2023, only 82.36% of households in Indonesia had access to proper sanitation, a result that has not yet met the target set in the National Medium-Term Development Plan, with a minimum target of 90% in 2024 for households to have access to proper sanitation. The Special Region of Yogyakarta (DIY) has met the standard for proper sanitation provision, which is 96.42%, meaning that 3.58% still do not have adequate sanitation. However, the provision of clean drinking water in DIY has not yet met the standard, with 96.69% coverage compared to the RPJMN target of 100%. According to a report by IDN Times Jogja, the Bantul Health Department stated that there are still 1,000 households in Bantul Regency that do not have proper sanitation facilities, which is causing inadequate sanitation and contaminated water, leading to continuous occurrences of diarrhea.

Based on a study by Santika (2022), it was found that there is a relationship between the availability of clean water (p-value 0.002), proper waste disposal (p-value 0.019), infectious diseases (p-value 0.028), and food preparation and provision (p-value 0.013) with the incidence of diarrhea in toddlers in the working area of the Menggamat Health Center. Similarly, Siregar's (2021) research showed results (p = 0.00, CI = 95%) and (p = 0.00, CI = 95%), indicating a strong relationship between environmental sanitation and the incidence of diarrhea in the Belongkut Health Center area.

A study by Siregar & Yuni (2021) mentioned that environmental sanitation, including the use of clean water, proper sanitation facilities for waste disposal, and the management of waste, has a strong relationship with the incidence of diarrhea in children under 5 years old. This is slightly different from the results obtained by Basyariyah (2022), who found that only the quality of clean water had a strong relationship with environmental sanitation, while other sanitation factors such as the availability of toilets and wastewater disposal systems did not show a significant relationship with the incidence of diarrhea.

MATERIALS AND METHODS

This study uses an analytical descriptive research design, which involves the collection of objective information to determine the strength of the relationship between the two variables (Sugiyono, 2019). The research design employs a cross-sectional approach, which involves collecting data on independent and dependent variables simultaneously. The population used in this study consists of all toddlers with diarrhea at the Bantul Community Health Center, totaling 981 toddlers based on data from January to March 2024.

The sampling technique used is purposive sampling, where the researcher has specific considerations in selecting the sample (Sugiyono, 2019). The sample in this study consists of 98 toddlers and parents from the integrated health service post (posyandu) in the working area of the Bantul I Community Health Center. Data collection was carried out by filling out environmental sanitation questionnaires and diarrhea occurrence questionnaires. Data analysis was performed using univariate and bivariate analysis with the Lambda Symmetric test. This study has been approved for ethical feasibility by the Ethics Committee of the General Achmad Yani University of Yogyakarta, issued on August 26, 2024, with the decision number SKep/515/KEP/VIII/2024.

RESULTS

Characteristics of parents were shown in this table 1

Table 1 Characteristics of Respondent Parents

Characteristics	Frequency	Presentase (%)
Mother's Age		
20 – 35 Years	77	78,6
36 – 51 Years	21	21,4
Education		
Basic Education	41	41,8
Secondary Education	47	48,0
Higher Education	10	10,2
Occupation		
Housewife	42	42,9
Farmer	43	43,9
Civil Servant	8	8,2
Entrepreneur	5	5,1
Total	98	100,0

Source: Primary Data 2024

Based on Table 1, it can be explained that the majority of the parent respondents in the study are aged between 20 and 35 years, totaling 77 people (78.6%). In terms of education level, the majority had a secondary education, with 47 people (48.0%). Regarding occupation, most were farmers, with 43 people (43.9%). Child characteristics were shown in Table 2 below

Table 2 Child Characteristics
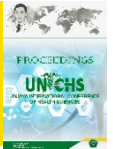
Characteristics	Frequency	Presentase (%)
Child's Gender		
Male	52	53,1
Female	46	46,9
Child's Age		
1 Year	5	5,3
2 Year	11	11,2
3 Year	27	27,6
4 Year	15	15,3
5 Year	40	40,8
Total	98	100,0

Source: Primary Data 2024

Based on Table 2, it can be explained that the majority of the children were male, with 52 children (53.1%), and in terms of age, the majority were 5 years old, with 40 children (40.8%).

Environtmental sanitation overview was shown in Table 3 below

Table 3 Environmental Sanitation Overview

Environmental Sanitation	Frequency	Persentase (%)
Does Not Meet Standars	24	24,5
Meets Standars	74	75,5
Total	98	100,0

Source: Primary Data 2024

Based on Table 3, it can be explained that the majority of respondents had environmental sanitation that met the standards, with 74 respondents (75.5%). In contrast, the minority had environmental sanitation that did not meet the standards, with 24 respondents (24.5%).

Table 4 Overview of Diarrhea Incidence in Toddlers

Diarrhea	Frequency	Persentase (%)
Diarrhea	53	54,1
No Diarrhea	45	45,9
Total	98	100,0

Source: Primary Data 2024

Based on Table 4, it can be explained that the majority of respondents who experienced diarrhea were 53 respondents, accounting for 54.1%, while 45 respondents, or 45.9%, did not experience diarrhea.

Table 5 Relationship Between Environmental Sanitation and the Incidence of Diarrhea

Environmental Sanitation	Diarrhea	Total	p-value
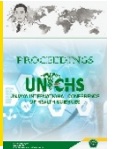
	Diarrhea	No Diarrhea		
Not Meeting Requirements	22	2	24	0,000
Meeting Requirements	38	36	74	
Total	60	38	98	

Source: Primary Data 2024

Based on Table 5, from 98 respondents in the study, it was found that 24 respondents with inadequate environmental sanitation had 22 respondents who experienced diarrhea and 2 who did not. Meanwhile, 74 respondents with adequate environmental sanitation had 38 respondents who experienced diarrhea, and 36 did not.

The results of the symmetric lambda test yielded a p-value of 0.000 < 0.05 with an r-value of 0.127, meaning there is a strong relationship between environmental sanitation and the incidence of diarrhea in toddlers at the Bantul 1 Community Health Center.

DISCUSSION

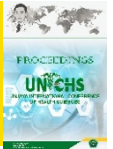*Overview of Environmental Sanitation in the Working Area of Bantul Health Center 1*

Based on Table 3, it can be seen that out of 98 respondents, the majority had environmental sanitation that met the standards, with 75.5%, while 24.5% did not meet the standards. Basic sanitation refers to the essential facilities needed in an environment to support human health. Environmental sanitation factors that significantly influence the occurrence of diarrhea include clean water, the use of latrines, wastewater disposal systems (SPAL), garbage disposal, and a healthy environment, as well as the implementation of healthy lifestyle behaviors in daily life, such as handwashing with soap.

According to research by Santi, the majority of environmental sanitation was categorized as "Good," with 46 respondents (76.7%). Deva Santika[3] noted that environments with poor sanitation can be a source of various diseases that affect human health, one of which is diarrhea. Important environmental sanitation factors include clean water sources, the presence of household latrines, clean homes, and environments free from disease sources.

Overview of Diarrhea Incidence in Toddlers in the Working Area of Bantul 1 Health Center

Based on Table 4 above, it can be seen that out of 98 respondents, 54.1% experienced diarrhea, while 45.9% did not. Diarrhea is a disease characterized by an increased frequency of bowel movements beyond normal (usually more than three times a day), accompanied by changes in the shape and consistency of the stool, vomiting, or loose stools, often occurring once a day but marked by mucus or blood.

Diarrhea is more dominant in toddlers because their immune system is still weak, making them highly susceptible to the spread of bacteria that cause diarrhea. If diarrhea is accompanied by continuous vomiting, it can lead to dehydration (fluid deficiency). Diarrhea can occur due to both direct and indirect factors. Direct causes include infections by bacteria, viruses, and parasites, malabsorption, allergies, poisoning from chemicals, or toxins

produced by microorganisms, fish, fruits, and vegetables. Indirect factors, or factors that accelerate the occurrence of diarrhea, include nutritional status, exclusive breastfeeding, the environment, clean and healthy living behavior (PHBS), handwashing habits, eating behavior, immunization, and socio-economic factors.

The Relationship Between Environmental Sanitation and Diarrhea Incidence in Toddlers at Bantul 1 Health Center

Based on Table 5, it can be seen that out of 98 respondents, 24 had environmental sanitation that did not meet the standards, with 22 experiencing diarrhea and 2 not experiencing diarrhea. Meanwhile, 74 respondents had environmental sanitation that met the standards, with 38 experiencing diarrhea and 36 not experiencing diarrhea. The results of the lambda symmetric test yielded a p-value of 0.000 < 0.05, indicating a strong relationship between environmental sanitation and diarrhea incidence in toddlers at Bantul 1 Health Center.

The results of this study are consistent with research by Anggi Kurnia, which stated that one of the causes of diarrhea is improper management both at home and in the surrounding environment. Poor environmental sanitation increases the incidence of diarrhea, while a better environment reduces it. Good sanitation includes healthy housing, waste disposal, clean water supply, and more.

A key risk factor for diarrhea in toddlers is the health status of the environment (use of clean water facilities, household latrines, waste disposal, and wastewater disposal) and healthy living behaviors within the family. The most dominant environmental factor is the availability of clean water facilities.

CONCLUSION

Based on the results of the research conducted in the working area of Puskesmas Bantul 1, it can be concluded that the environmental sanitation in this area is mostly categorized as meeting the standards, with 75.5%, while 24.5% is categorized as not meeting the standards. The incidence of diarrhea in children under five in the working area of Puskesmas Bantul 1 was highest for diarrhea, at 54.1%, and non-diarrhea at 45.9%.

The researcher has analyzed the relationship between Environmental Sanitation and the Incidence of Diarrhea in the Working Area of Puskesmas Bantul 1. The results of the lambda symmetric test yielded a p-value of 0.000 < 0.05 with an r value of 0.127, which indicates a significant relationship between environmental sanitation and the incidence of diarrhea in children under five in Puskesmas Bantul 1.

The researcher hopes that Puskesmas Bantul 1 can conduct counseling and involve village officials and local residents in efforts to improve environmental sanitation, including environmental cleanliness, personal hygiene (such as handwashing habits), regular clean water inspections, and monitoring the number of families who have not yet used proper sanitation facilities, in order to reduce the incidence of diarrhea, especially in children under five.

SUGGESTIONS

It is hoped that this thesis and research can serve as a source of supporting data or references for future researchers on environmental sanitation, but with different variables, such as the impact of environmental sanitation on other disease causes.

REFERENCES

Adrian. M. (2021). Pedoman sanitasi lingkungan. Yogyakarta:Diva press. Cet-1. ISBN 978-623-293-484-9

Akhondi, Hossein ; Kari A.Simonsen. (2023). Bacterial Diarrhea. StatPearls. Link: https://www.ncbi.nlm.nih.gov/books/NBK551643/

Anggi Kurnia Adha Harahap. (2021). Jurnal Kesehatan. Hubungan Sanitasi Lingkungan dengan Kejadian Diare Dirantauprapat. Fakultas ilmu Kesehatan Masyarakat Universitas Islam Negeri Sumatera Utara. Ditinjau tanggal 09 Oktober 2023. https://ejournal.unaja.ac.id/index.php/JKKM/article/download/1116/817/

Badan Pusat Statistik. (2022). Statistik Indonesia 2022. Jakarta: Badan Pusat Statistik

Badan Perencanaan Pembangunan Nasional. (2021). SDGs Dashboard Indonesia. https://sdgs.bappenas.go.id/website/wp-content/uploads/2023/02/LAPORAN-PELAKSANAAN-SDGS-2021.pdf

Badan Pusat Statistik (2023). Persentase Rumah Tangga menurut Provinsi, Tipe Daerah dan Sanitasi Layak (Persen), 2021-2023. Link https://www.bps.go.id/id/statistics-table/2/ODM0IzI=/persentase-rumah-tangga-menurut-provinsi--tipe-daerah-dan-sanitasi-layak.html

Badan Kependudukan Keluarga Berencana Nasional. (2022). Sanitasi Lingkungan. Artikel. link: https://kampungkb.bkkbn.go.id/kampung/14028/intervensi/415070/sanitasi-lingkungan

Basyariyah, Q., Khuliyah, C.D, Aditya, S.P. (2022). Hubungan Ketersediaan Sanitasi Dasar terhadap kejadian diare. Jurnal Kesehatan Lingkungan Indonesia 21(1) Tahun 2022.

Birawida, A. B. (2020). Sanitasi dan keberadaan bakteri pada air minum dengan risiko diare di Pulau Barrang Lompo. *Jurnal Nasional Ilmu Kesehatan*, *3*(1), 1-13.

Dahlan, M. S. (2016). *Statistik Untuk Kedokteran dan Kesehatan*. Jakarta : Salemba Medika.

Damayanti, I. P. (2017). Hubungan Ketersediaan Air Bersih dengan Kejadian Diare pada Balita. Menara Ilmu, XI(78), 48–52.

Deva Santika, Basri Aramico dan Farrah Fahdhienie. (2022). Kejadian Diare Di wilayah Kerja Puskesmas Meggamat Kecamatan Kluet Tengah Kabupaten Aceh Selatan Tahun 2022. *Jurnal Hubungan Sanitasi Lingkungan. vol. 1, no. 1*. https://ejournal.unaja.ac.id/index.php/JKKM/article/download/1116/817/

Dinas kesehatan DIY. Profil Kesehatan Provinsi DI Yogyakarta. Yogyakarta : Dinas Kesehatan Yogyakarta; 2022

Direktorat Jenderal Pencegahan dan Pengendalian Penyakit, (2023) Kemenkes RI.

EPA. (2021). *United States Environmental Protection Agency. Impacts of Mismanaged Trash*

Garret J, Descoteaux-Friday & Isha Shrimanker. (2023). *Chronic Diarrea*. Statpearls. https://www.ncbi.nlm.nih.gov/books/NBK544337/

Indonesia Times Jogja. (2023) Ribuan KK di Bantul Belum Memiliki Jamban Sehat link: https://jogja.idntimes.com/news/jogja/hironymus-daruwaskita/ribuan-kk-di-bantul-belum-memiliki-jamban-sehat-c1c2.

Kementrian Kesehatan. (2023). Diare. Ayo sehat. Link: https://ayosehat.kemkes.go.id/topik-penyakit/penyakit-pencernaan/diare

Kementerian Kesehatan RI. (2014). Peraturan Menteri Kesehatan Nomor 3 Tahun 2014 tentang Sanitasi Total Berbasis Masyarakat. Jakarta: Kementerian Kesehatan RI.

Kementerian Kesehatan RI. 2023. Profil kesehatan Indonesia. Jakarta: Kementerian Kesehatan RI.

National Water And Sanitation Informasi Service (NAWASIS). (2020). Database berdasarkan SDGs. https://www.nawasis.org/portal/database/home/definisi

Nemeth, Valerie & Nicholas Pflehaar . (2022). Diarrhea. StatPearls. Link: https://www.ncbi.nlm.nih.gov/books/NBK448082/#_ncbi_dlg_citbx_NBK448082

Notoatmodjo, S. (2018). *Metodologi Penelitian Kesehatan* (3rd ed.). Jakarta: Rienka Cipta.

Peraturan Menteri Lingkungan Hidup dan Kehutanan Republik Indonesia Nomor 6 Tahun 2022 Tentang Sistem Informasi Pengelolaan Sampah Nasional

Rahman, A., Fea, F., Defriman, D., Nur, I.R.A. (2021). Faktor-Faktor yang Mempengaruhi Sanitasi Lingkungan di Rural Area dan Urban Area di Provinsi Sumatera Barat 2020. *Jurnal Keselamatan, Kesehatan Kerja dan Lingkungan (JK3L).* Vol .02, No. 02.

Roflin, E. (2021). *Pengelolaan dan Penyajian Data Penelitian Bidang Kedokteran.* Nasya Expanding Manajemen.

Santika, Deva. (2022). Hubungan Sanitasi Lingkungan Dengan Kejadian Diare pada Balita di Wilayah Kerja Puskesmas Menggamat Kecamatan Kluet Tengah Kabupaten Aceh Selatan Tahun 2022. Jurnal Sains Riset (JSR) p-ISSN 2088-0952, e-ISSN 2714-531X http://journal.unigha.ac.id/index.php/JSR DOI. 10.47647/jsr.v10i12

Sedata Sebantul. (2023). Jumlah Kasus Penyakit Diare di Wilayah Kerja Puskesmas Kapanewon. Link: https://demo5.kab-bantul.id/search/detail?data_id=1.02.0274&ryear=2021%20-%202023

Siregar, S. I. (2013). *Statistik Parametri Untuk Penelitian Kuantutatif.* Jakarta: Pt Bumi Askara.

Siregar, Yuni Harmila. (2021). Hubungan Sanitasi Lingkungan Terhadap Kejadian Diare Pada Balita di Wilayah Kerja Puskesmas Belongkut. Skripsi. Fakultas Kesehatan Masyarakat Universitas Islam Negeri Sumatera Utara. Link: http://repository.uinsu.ac.id/13703/1/SKRIPSI%20YUNI%20HARMILA%20SIREGAR%200801172221.pdf

Sugiyono. (2019). *Metode Penelitian Kuantitatif Kualitatif dan R& D.* Alfabeta.

UNICEF. (2024). Diarrhoea remains a leading killer of young children, despite the availability of a simple treatment solution. New York. 2024 link: https://data.unicef.org/topic/child-health/diarrhoeal-disease/

Wahyuni, Candra (2018). PANDUAN LENGKAP TUMBUH KEMBANG ANAK USIA 0 – 5 TAHUN. Jawa timur. Strada press. ISBN : 978-602-5842-08-5.

Wahyuni, NS (2022). Tumbuh kembang anak. Artikel. Kemenkes RI. https://yankes.kemkes.go.id/view_artikel/1669/tumbuh-kembang-anak

World Health Organization (2024). Diarrhoeal Disease link : https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease