

## Household waste management and the incidence of diarrhea in toddlers

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### Abstract

Diarrhea is a big problem in developing countries that can cause death, especially in toddlers, and cause extraordinary events. There are three risk factors for Diarrhea: environmental, social demographics, and behavior. Environmental factors include waste management. This research aims to determine the relationship between waste management and the incidence of Diarrhea in toddlers.

The research design is quantitative analytical with a *cross-sectional research design*. The population in this study is the total number of children under five in mid-2023, totaling 1428. The sampling technique was *proportional random sampling*. Data collection method using interviews. Data were analyzed statistically using the *chi-square test*.

The research results showed that the majority of waste management was poor: 68 (87.2%) experienced Diarrhea, and the majority of waste management did not experience Diarrhea well, 12 (66.7%). The results of the data analysis show that the *p-value* = 0.002, so there is a significant relationship between household waste management and the incidence of Diarrhea in toddlers.

The community should always practice clean and healthy living (PHBS), such as good waste management, washing hands with running water, and using soap, especially before feeding toddlers.

**Keywords:** Waste Management; Household; incidence; Diarrhea; Toddler

### 1. Introduction

In developing countries like Indonesia, Diarrhea is a big problem. Diarrhea is one of the leading causes of malnutrition, which can cause death and extraordinary events, especially in toddlers. Diarrhea is an endemic disease that can generate unique events and is still the leading cause of death in Indonesia.[1] Worldwide, 1.7 billion cases of Diarrhea occur each year and kill 760,000 children. In addition, 780 million people do not have access to drinking water, and 2.5 billion people lack sanitation [2]. The results of primary health research in 2018 showed that Diarrhea occurred in 8 percent of all age groups, 12.3 percent of toddlers, and 10.6% of babies [3].

West Java Province health profile data in 2021 shows that the number of people served for toddler diarrhea is 82.40%, far below the national target of 10% [4]. However, data on the health profile of Cirebon Regency in 2021 shows that the number of cases of Diarrhea in children under five being treated reached 36.9%, exceeding the national estimated target of 20%. Waled Health Center UPTD data for the last three years shows that the incidence of Diarrhea in 2020 was 93 cases; in 2021, there were 170 cases, and in 2022 there were 225 cases. Based on cases in the last three months of 2022,

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it is known that in October, there were 25 cases, November 29 cases, and December 39 cases. Based on the annual report of the UPTD Puskesmas Waled for the last three years, the incidence of Diarrhea in toddlers in 2020 was 14.5%, in 2021 26.69%, and in 2022 59.53%, still relatively high compared to the national target of only 10%.

There are three main risk factors for Diarrhea: environmental, sociodemographic, and behavioral. Environmental factors include clean water facilities and waste disposal facilities. Sociodemographic factors include age, gender, education level, type of work, and nutritional status. Health behavioral factors include hand washing behavior, feces disposal habits, and bottle use habits [5]. To avoid Diarrhea, there are several steps, namely: constantly washing your hands, consuming food and drinks that have been cooked until fully cooked, and ensuring that the surrounding environment is not contaminated with food and drinks [6].

Although household waste cannot be avoided, it can be reduced and controlled. A straightforward way to reduce the amount of household waste is to separate organic and inorganic waste. Organic waste can be processed into compost, and inorganic waste can be used to make various recycled products. Waste can hurt humans and the environment and cause disasters and disease in local communities[7]. Diarrhea, salmonellosis, shigellosis, staphylococcal food poisoning, and disease-spreading vectors such as mosquitoes, mice, cockroaches, and flies are sources of disease. Garbage can also pollute the land and cause unpleasant odors and unpleasant sights. As a result, waste management is critical to prevent the spread of disease. Trash bins must be available; rubbish must be collected and thrown into temporary shelters daily. Waste can be destroyed by landfilling or burning if it cannot be accessed by a waste disposal service to a final disposal site [8].

Based on the Kesling program report in 2022, it was found that household waste management achievements were still less than 40% compared to the UPTD target for the Waled Community Health Center of 65%. Research conducted by Dina (2020) concluded that there is a relationship between waste management and the incidence of Diarrhea.[9] Toddler diarrhea is associated with final processing of household waste ( $p = 0.000$ )[10].

The results of this research can provide an overview of strategies for preventing diarrhea so that people can get used to clean and healthy living behavior (PHBS) such as good household waste management. So this research aims to analyze the relationship between waste management and the incidence of diarrhea in toddlers.

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## 2. Material and method

### 2.1. Research Design

This research is a quantitative research with a cross-sectional research design. The population in this study was the total number of toddlers in the Waled Health Center UPTD working area in mid-2023, totaling 1428. The sample size was 93 samples. The sampling technique in this research used proportional random sampling. This study's inclusion criteria are mothers with toddlers aged 1-5 years. The exclusion criteria in this study are mothers whose housing status is boarding or rental and mothers who cannot communicate well. Interviews were carried out for data collection in this research. The independent variable in this research is household waste management and the dependent variable in this research is the incidence of diarrhea in toddlers. The instruments used in this research used standard questionnaires, namely household waste management questionnaires and diarrhea incidence questionnaires in toddlers.

### 2.2 Data analysis

Data analysis in this study used univariate analysis and bivariate analysis, with the chi square test.

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## 3. Result

Based on Table 1, it is known that 74 (77.1%) of the 96 respondents who had toddlers experienced Diarrhea, and 22 (22.9%) of the toddlers did not experience Diarrhea. Household waste management was as poor as 78 (81.3%), and household waste management was as good as 18 (18.8%).

**Table 1** Frequency Distribution of Household Waste Management and Diarrhea Incidence

Household Waste Management	Frequency	Percentage (%)
Not good	78	81.3
Good	18	18.8
<b>Diarrhoea Occurrence</b>		
Diarrhoea	74	77.1
No diarrhoea	22	22.9
Total	96	100.0

**Table 2** Relationship between Household Waste Management and Diarrhea incidence

No	Household Waste Management	Occurrence of Diarrhea in Toddlers				Amount		P value
		Diarrhea		No diarrhoea		n	%	
		n	%	n	%			
1	Not good	68	87.2	10	12.8	78	100	0.002
2	Good	6	33.3	12	66.7	18	100	
Amount		74	77.1	22	22.9	96	100	

Based on Table 2, it was found that the majority of waste management was poor: 68 (87.2%) experienced Diarrhea, and the majority of waste management did not experience Diarrhea well, 12 (66.7%). The results of data analysis using the chi-square test showed that the p-value = 0.002, so there is a significant relationship between household waste management and the incidence of Diarrhea in toddlers.

#### 4. Discussion

The study's results showed a significant relationship between household waste management and the incidence of Diarrhea in toddlers (p-value = 0.002). These results align with research by Dina (2020), who found a relationship between household waste management and the incidence of Diarrhea in toddlers[9],[11]. Dikna (2023) stated that there is a relationship between household waste management and the incidence of Diarrhea in toddlers 24-59 months[9].

The results of data analysis show that diarrhea in toddlers is related to waste management (p=0.000, PR = 27.5)[12]. The position of the family trash can is the variable that has the most influence on the occurrence of diarrhea. The government must increase outreach and facilities for the community to implement better waste management[13].

This research showed that waste management was not good; most experienced Diarrhea, 68 (87.2%). Environmental, sociodemographic, and behavioral factors influence the incidence of Diarrhea. Environmental factors include clean water facilities and waste disposal facilities. Health behavioral factors include hand washing behavior, feces disposal habits, latrine use habits, milk bottle use habits, and feeding[5].

Waste control aims to reduce or eliminate environmental problems. Waste management processes vary, including collection, transportation, and destruction. Each stage influences the level of system cleanliness[14]. Diarrhea is an environmentally dependent disease; waste management can prevent diarrhea[8], [9]. Environmental factors influence the health of individuals and communities, and littering in sewers or rivers[6]. Innovative efforts are needed so that society can better manage household waste, this is useful for preventing diarrhea in toddlers[15].

This study showed that most respondents experienced Diarrhea (77.1%). This was due to poor waste management; the immune system of toddlers is very vulnerable to Diarrhea, and toddlers experience more than one Diarrhea within three months. Diarrhea in toddlers is greatly influenced by diet and parenting patterns. The community must further improve

clean and healthy lifestyles and maintain good sanitation in the community's environment to avoid environmental-based diseases such as diarrhea.

In this study, it was found that the majority (81.3%) of waste management was not good because, based on phenomena in the field, including still throwing rubbish carelessly and out of place, rubbish bins without covers, no sorting of organic and non-organic waste, there are still many insects or disease-carrying vectors around existing trash bins and trash bins are rarely cleaned. In this study, there is a relationship between household waste management and the incidence of Diarrhea in toddlers because society is not good at managing household waste, such as still throwing rubbish carelessly out of place, rubbish bins without covers, no waste sorting, organic and non-organic, and rarely clean the trash.

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## 5. Conclusion

Household waste management was poor at 81.3% and good at 18.8%. The incidence of Diarrhea in toddlers who had Diarrhea was 77.1%, and in toddlers who did not experience Diarrhea, it was 22.9%. There was a relationship between household waste management and the incidence of Diarrhea with  $p$ -value = 0.002.

It is best to continue educating the public about household waste management through counseling and simulations. Efforts are being made to improve environmental sanitation conditions, such as providing waste management facilities. The community always practices clean and healthy living (PHBS), such as good waste management, washing hands with running water, and using soap, especially before feeding toddlers.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

The authors declare no conflicts of interest.

### *Statement of ethical approval*

This research has received ethical permission from the Research Institute for Development and Community Service, Cirebon College of Health Sciences, with Ethical Permit Number 092/B/STIKes Crb/V/2023.

### *Statement of informed consent*

Provide information about research objectives, research benefits, and guarantee the confidentiality of research samples. After the explanation was given, the subject understood and was willing to be a respondent, then given a letter of approval to become a respondent by signing informed consent.

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