



## Basic Sanitation Factors Affecting Diarrheal Disease in Toddlers: Observations in the Working Area of Tambakrejo Health Center

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**Abstract.** Diarrhoea is a condition in which a person feels defecation with liquid or watery stools, generally occurring more than three times per day. Diarrhoea in toddlers in the area work Puskesmas Tambakrejo City Surabaya for the last 3 years (2020-2023) has increased. The increase shows an increasing trend of cases so it is necessary to know the cause. The purpose of this study was to identify factors - factors causes of diarrhoea in toddlers, namely: clean water facilities, healthy toilet facilities, sewerage and garbage disposal facilities in the homes of toddlers with diarrhoea. This study uses descriptive research with a approach *cross-sectional* using 47 samples. This research is a survey study by making observations at the same time or once upon a time with the help of questionnaires and interviews with mothers of toddlers. The results showed that as many as 80.9% of respondents who had clean water facilities met requirements, 80.9% of respondents' healthy latrine facilities met the requirements, 95.7% of respondents' sewerage met the requirements and 61.7% of waste disposal facilities met the requirements. The conclusion of this study shows that all variables studied fulfil the requirements of the applicable health standards. fulfil the requirements by the applicable standard quality of health. The region's community is expected to implement clean and healthy living behaviour.

**Keywords:** Clean Water Facilities, Diarrhoea , Healthy Latrine Facilities, Waste Disposal Facilities , Waste Water Disposal Channels

### 1. Introduction

Diarrhoeal diseases remain one of the leading causes of morbidity and mortality in children under five worldwide, especially in developing countries. According to WHO and UNICEF, there are approximately 2 billion cases of diarrhoea each year and 1,9 million children under five die from diarrhoea in all corners of the world. Referring to this number, 78% of deaths occur in developing countries, especially in Africa and Southeast Asia (Kementerian Kesehatan RI, 2023). In Indonesia, diarrhoea is the second leading cause of death in children under five after pneumonia (Hardhana et al., 2021). In the Tambakrejo Health Centre area of Surabaya City, this phenomenon is an urgent issue to be addressed, given the high prevalence of diarrhoeal diseases faced by toddlers. By considering the impact of basic sanitation on the health of toddlers, this study aims to analyse the basic sanitation factors that influence the incidence of diarrhoeal disease in toddlers.

Public health problems are strongly influenced by environmental conditions, especially by the quality of sanitation. Poor sanitation can have a negative impact on human life associated with a decrease in proper sanitation facilities, such as: clean water facilities, healthy latrines, waste disposal, and inadequate waste disposal facilities are contributing factors to the high incidence of diarrhoeal disease in children under five.

According to a study by Prawati (2019) Poor and unqualified sanitation conditions and limited clean water infrastructure facilities can increase the risk of diarrhoeal disease. This suggests that toddlers living in environments with poor sanitation are at higher risk of exposure to pathogens that cause diarrhoea. In Puskesmas Tambakrejo Surabaya City, inadequate sanitation conditions need serious attention, because it can trigger an increase in diarrhoea cases that are dangerous to the health of children under five.

In addition, the behaviour of people who do not understand the importance of sanitation also contributes to this problem. According to Abidin et al., (2022) The use of safe drinking water sources, proper water management, and ownership of facilities such as waste bins and latrines that meet standards, coupled with maternal hygiene practices, especially proper handwashing, can reduce the risk of diarrhoea in children under five. Therefore, the need for knowledge in performing these steps to prevent diarrhoea in toddlers.

Studies have shown that improved sanitation and access to clean water can reduce the incidence of diarrhoea. Studies show that improvements in sanitation and access to clean water can reduce the incidence of diarrhoea. This study is in line with Wolf et al., (2022) the provision of water filtration facilities with better quality water from better sources and improved hygiene will provide better protection from diarrhoeal pathogens. According to Merid et al., (2023) states that improved sanitation conditions and drinking water sources can significantly reduce the risk of diarrhoea among children under five years old. Although many studies emphasise the importance of sanitation, there is still a gap in understanding the specific factors that influence the incidence of diarrhoea in the Tambakrejo Health Centre working area of Surabaya City. A study by Macleod (2024) shows that behaviour change efforts have the potential to improve sanitation and environmental hygiene practices including: latrine facilities, handwashing with soap at the household level. So community behaviour and knowledge are often overlooked in understanding the importance of hygiene and sanitation to prevent disease transmission, especially diarrhoea. Therefore, further research is needed to explore these factors in the working area of Puskesmas Tambakrejo Surabaya City.

Although many studies address the relationship between sanitation and diarrhoeal disease, there is still a knowledge gap regarding the specific conditions in the Tambakrejo Health Centre area. Various studies are generalised and do not provide a clear picture of the interaction of basic sanitation factors and their influence on the incidence of diarrhoea in children under five years of age in the local context. Research that emphasises specific variables, such as: clean water facilities, healthy latrine facilities, wastewater disposal facilities and waste management is very important in the region. This research is in line with Farham & Petro (2021) that improved sanitation facilities have a direct impact on diarrhoeal disease prevalence by reducing exposure to faecal pathogens. Therefore, it is necessary to understand the local conditions at Puskesmas Tambakrejo Surabaya City so that the interventions carried out are more effective and in accordance with the needs of the community.

This research is increasingly relevant in supporting the Indonesian government's efforts to improve sanitation policy. Along with the target of achieving the *Sustainable Development Goals* (SDGs) by 2030, especially related to proper sanitation and access to clean water, accurate and specific data is needed to develop effective policies. As a first step in addressing this problem, this study aims to provide a clear picture of the basic sanitation factors that contribute to the incidence of diarrhoeal disease in children under five years of age in the Tambakrejo Health Centre working area of Surabaya City. By understanding the existing conditions, it is hoped that strategic steps can be recommended

for sustainable and effective sanitation improvements, so as to improve public health and reduce the incidence of diarrhoea in children under five.

## 2. Methods

This study used descriptive research with a *cross sectional* approach. The research variables included clean water facilities, healthy toilet facilities, waste water disposal facilities and garbage disposal facilities. The object of research is the mother of diarrhoea sufferers who have toddlers aged 1-5 years who seek treatment at Puskesmas Tambakrejo, Surabaya City. The population used was 88 people derived from data on diarrhoeal diseases in toddlers at Puskesmas Tambakrejo Surabaya in January - March 2024. Research data were collected by making observations at the same time or at one time with the help of questionnaires and interviews with mothers of diarrhoea sufferers. The data were analysed descriptively by describing the research variables that cause diarrhoea in the Tambakrejo Health Centre working area in Surabaya.

## 3. Results

Based on the results of interviews and observations which include variables of clean water facilities, healthy latrine facilities, wastewater disposal facilities and garbage disposal facilities in the working area of Puskesmas Tambakrejo Surabaya City, the following results were obtained:

**Table 1: Variable Frequency Distribution of Basic Sanitation Facilities for Diarrhoea in Toddlers in the Tambakrejo Health Centre Working Area**

Variable	F	%	N	
			F	%
<b>Clean Water Facilities</b>				
Not Qualified	9	19.1%	47	100
Eligible	38	80.9%		
<b>Healthy Latrine Facilities</b>				
Not Qualified	9	19.1%	47	100
Eligible	38	80.9%		
<b>Wastewater Disposal Facilities</b>				
Not Qualified	2	4.3%	47	100
Eligible	45	95.7%		
<b>Waste Disposal Facilities</b>				
Not Qualified	18	38.3%	47	100
Eligible	29	61.7%		

Table 1 shows that the condition of clean water facilities that do not meet the requirements is 19.1% (9 respondents) and 80.9% (38 respondents), so it can be concluded that clean water facilities have met the overall requirements. Healthy latrine facilities that do not meet the requirements are 19.1% (9 respondents) and 80.9% (38 respondents). The condition of healthy latrine facilities that do not meet the requirements is 19.1% (9 respondents) and 80.9% (38 respondents), which means that it has met the overall requirements. The condition of sewerage that does not meet the requirements 4.3% (2 respondents) and meets the requirements 95.7% (45 respondents) which means it has met the overall requirements. The condition of garbage disposal facilities that do not meet the requirements 38.3% (18 respondents) and meet the requirements 61.7% (29 respondents)

which means that it does not meet the overall requirements. The data above shows that all basic sanitation variables, namely: clean water facilities, healthy latrines and sewerage facilities in the area have met the requirements. However, waste disposal facilities still require more attention because they have not fully met the quality standards that have been set.

#### 4. Discussion

Based on these conditions, this study aims to describe the basic sanitation factors that affect the incidence of diarrhoeal disease in toddlers in the Tambakrejo Health Centre working area of Surabaya City. The basic sanitation studied includes clean water facilities, healthy toilet facilities, sewerage and garbage disposal facilities. This discussion will describe the impact of each basic sanitation factor on the incidence of diarrhoea in children under five.

Clean water facilities are a major component in the prevention of diarrhoeal disease. The use of clean, safe water for drinking, cooking and handwashing is essential to prevent the transmission of bacteria that cause diarrhoea. Research conducted Utama et al (2019) shows that the condition of clean water facilities that meet the requirements will reduce the frequency of diarrhoea in toddlers and vice versa. The condition of clean water facilities that are maintained cleanliness in the Tambakrejo Health Centre area of Surabaya City is a factor in reducing the incidence of diarrhoea in toddlers.

The results showed that the condition of clean water facilities at Puskesmas Tambakrejo has met the requirements. However, other findings from the study also show that clean water facilities in the Tambakrejo Puskesmas area have not met the requirements because the quality of clean water does not meet applicable health quality standards, such as: turbid water, coloured water and clean water containing *Escherichia coli* bacteria. A study by Tuba et al (2024) explains that by improving the condition of clean water facilities, sanitation and individual hygiene can reduce pathogen infections, especially diarrhoea in children. Therefore, it is important to improve the condition of clean water facilities that do not meet health quality standards and the quality of clean water facilities in the working area of Puskesmas Tambakrejo Surabaya City in order to reduce the incidence of diarrhoea in toddlers.

Healthy latrines are effective faecal disposal facilities to break the chain of disease transmission. Healthy latrines must be built, owned, and used by the family with placement (inside the house or outside the house) that is easily accessible to the occupants of the house (Menteri Kesehatan Republik Indonesia, 2014). Healthy latrines are an important aspect of basic sanitation. Inadequate or unmaintained latrines can be a source of spread of pathogens that cause diarrhoea.

The results showed that many homes of toddlers with diarrhoea still use latrines that do not meet health standards, such as the distance between latrines and clean water sources < 10 metres, latrines that have poor lighting, latrines that do not have good ventilation and latrines that are not easy to clean (although latrines are often cleaned, their condition still looks dirty). Research by Soraya et al (2022) latrines that are located less than 10 metres from a clean water source can contaminate the clean water source used. If this contaminated water is used by respondents for their daily needs, it can potentially cause infectious diseases, especially diarrhoea and helminthiasis. According to Sinaga (2020) that inadequate latrines, even if they are largely enclosed structures and have roofs, still allow insects or vectors to spread bacteria that cannot be reached. In addition, latrines that are often cleaned but still look dirty also spread the bacteria or germs that cause diarrhoea. Healthy latrines promote better hygiene and sanitation behaviours, including

handwashing after using the latrine, which is an important step in preventing diarrhoea transmission. Therefore, there is a need for education in the use of healthy latrines to increase community awareness.

Wastewater is used water produced from kitchen waste, bathrooms, and hand washing facilities discharged into the sewerage system. (Menteri Kesehatan Republik Indonesia, 2014). Healthy sewerage that does not pollute clean water sources, does not cause puddles that become breeding grounds for insects or vectors, does not cause odours, does not cause mud, moisture and unpleasant views. (Setyawan & Setyaningsih, 2021). Adequate and well-managed wastewater disposal facilities play an important role in maintaining public health. Inadequate wastewater disposal facilities can lead to environmental pollution, which in turn increases the risk of diarrhoeal disease transmission.

The results showed that houses with diarrhoea in children under five still use a wastewater disposal system that does not meet health quality standards. This sewer, in an open condition, causes odour and becomes a breeding ground for insects or vectors that have the potential to contaminate clean water sources. According to Miswan et al (2018) household sewerage can be a breeding ground for various sources of disease. Wastewater disposal conditions that do not meet the standards will cause unpleasant odours, damage aesthetics, and become a breeding ground for vectors and disease-carrying animals such as: cockroaches, rats, flies which can increase the risk of disease spread. Sewerage in the yard area needs to be cleaned regularly so that the flow of wastewater is smooth and does not cause unpleasant odours. Therefore, efforts to improve wastewater disposal facilities in homes with diarrhoea in children under five should be a priority in an effort to reduce the incidence of diarrhoea in children under five.

Inadequate waste disposal facilities can lead to the accumulation of waste in the environment, which becomes a breeding ground for various disease vectors, including flies and rats. In the context of diarrhoea, these vectors can transmit pathogens to food and drink, increasing the risk of infection in toddlers. In the working area of Puskesmas Tambakrejo Surabaya City, there are still many houses with diarrhoea in toddlers experiencing problems with waste disposal facilities that do not meet the requirements.

Research results indicate that the waste disposal locations owned by the respondents are not located inside the house. Moreover, the bins do not have lids, which can lead to odours and provide breeding grounds for vectors and pests such as cockroaches and flies. Trash bins without lids can cause rubbish to easily scatter, and using only plastic bags as bins exacerbates the issue. If the bins consist merely of plastic bags without a sturdy container, the bags are likely to get damaged and torn. As a result, rubbish will easily scatter and produce an unpleasant smell. This research is in line with Abidin et al (2022) indicates that there is a relationship between ownership of rubbish bins and the incidence of diarrhoea in toddlers. Poor waste management can provide a habitat for disease vectors such as insects, rodents, fungi, and worms. These vectors can lead to diseases such as insect-borne illnesses including diarrhoea, cholera, and typhoid; mosquitoes can cause dengue haemorrhagic fever (DHF); while rodents are linked to diseases like plague; and worm vectors include tapeworm, hookworm, roundworm, and pinworm. Therefore, it is important to improve effective and regular waste disposal facilities, as well as to raise public awareness about the importance of environmental cleanliness in preventing diarrhoea in toddlers.

## 5. Conclusions and Suggestions

In order to reduce the incidence of diarrhoeal disease in children under five years of age in the Tambakrejo Health Centre area, basic sanitation factors such as clean water facilities, wastewater disposal, healthy latrines, and garbage disposal must be considered thoroughly. Implementation of policies that support improved sanitation and public health education is needed to create a healthier environment for children, especially toddlers, who are vulnerable to diarrhoeal diseases.

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