

Research Article

Relationship Between ODF and PHBS to the Incidence of Diarrhea in South Cimahi Public Health Center

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Abstract.

Diarrhea is a defecation disorder with a frequency of more than three times in 24 hr with watery stools. Based on data from the World Health Organization (WHO), there are 1.7 billion cases of diarrhea that occur globally each year, and in Indonesia, 200 to 400 per 1000 residents each year with 60–80% of cases being children under five years old. Based on data collected by South Cimahi Public Health Center, there were 922 cases of diarrhea in 2022. Diarrhea can be prevented by implementing ODF and Clean and Healthy Life Behavior (PHBS). The Open Defecation Free (ODF) program aims to help people in the area to be free from open defecation. This study aims to understand the relationship between ODF and PHBS behavior with diarrhea incidence of residents in the South Cimahi Health Center area using analytical observation with a cross-sectional study design. A total of 112 residents were selected using a simple random sampling technique. The results showed as many as 56.4% of families who have implemented ODF and have no incidence of diarrhea, and 86.2% of families who have not implemented PHBS with diarrhea. There is a relationship between ODF and PHBS with an incidence of diarrhea ($P = 0,00$) among residents in the South Cimahi Public Health Center area.

Keywords: diarrhea, ODF, PHBS, public health center

1. Introduction

Diarrhea is one of the environment-based diseases which can cause death. Diarrhea could be prevented by health and clean hygiene and sanitation. Though there are other etiology of the disease, about 88% of diarrhea-associated deaths are attributable to unsafe water, inadequate sanitation, and insufficient hygiene [1]. Based on data from World Health Organization (WHO), there are 1.7 billion cases of diarrhea occur globally each year. The incidence of diarrhea in Indonesia is estimated at around 200 to 400 per 1000 residents each year with 60 to 80% of cases being children under five years old. Based on data collected by South Cimahi Public Health Center in 2019, among 10.998 diarrhea cases, 3.883 cases were children under five years old. Another data

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recorded 512 cases of acute diarrhea and 20 cases of children under five years old in 2021. Meanwhile, in 2022 as many as 922 cases of acute diarrhea with 390 cases were children under five years old [2-5].

Open Defecation is a behavior of defecating other than on a latrine, which can contaminate the environment, soil, air, and water. Open Defecation Free (ODF) are villages in which the community in its area has carried out defecating in healthy latrines/toilets. The evaluation criteria in verification of ODF behavior in the Community-Based Total Sanitation Verification Guidebook include toilet holes with lids, feces disposal distance from water sources more than 10 meters, toilets made of strong material, baby/elderly feces (if there is any) is flushed down the toilet, every resident in the household uses the toilet, availability of anal cleansing, and no human excrement is seen around the house, the yard, outside/nature, and the rivers [4,6]. The objective of the ODF program planned by the government in 2019 is that 100% of residents in the area are defecating on latrines. Cimahi City achieved the 79.9% target of the ODF program while in the area of South Cimahi Public Health Center is 66.9% [4-6].

Clean and Healthy Living Behavior (PHBS) is a form of embodiment of a healthy life orientation in individuals, families, and in the community whose purpose is to improve, maintain, and protect their health physically, mentally, spiritually, and socially. There are 10 indicators of PHBS including childbirth assisted by health workers, exclusive breastfeeding, weighing infants and children up to six years of age, using healthy latrines, eradicating mosquito larvae, eating nutritious and healthy food, doing physical activity every day, and not smoke [3,4]. In 2020, Cimahi City was listed as one of 11 areas in Indonesia with coverage of households already applied PHBS less than 60%. Data in 2022 shows only 2598 (58.55%) from 6339 households have carried out PHBS in the area of South Cimahi Health Center [3,7,8].

Based on Tafere's study in the North Central Ethiopia, the prevalence of diarrhea among children residing in open-defecation-free areas was lower than that among children those who resided in non-open-defecation-free areas. In the area of South Cimahi Health Center, that have not reached the target and fact of high incidence of diarrhea in children under five years old, we are interested to know the relationship between ODF and PHBS programs with an incidence of diarrhea in South Cimahi Public Health Center area. The implementation of PHBS and ODF behavior is related to individuals, families, communities, and their environment's health which could be correlated with the incidence of diarrhea. The incidence of diarrhea in Cimahi City was still high and the achievement of ODF and PHBS programs didn't meet the target, the

health workers and government of the South Cimahi area still have to work hard to reduce the incidence of acute diarrhea [9,10].

2. Methods

The research method used was analytic observation with a cross-sectional design. Measurement for ODF and PHBS done using the questionnaire of Cimahi City Health Office's ODF Verification, Indonesian Ministry of Health's PHBS, and incidence of diarrhea for the last year. The population was residents who owned a place to live in the area of South Cimahi Public Health Center, which registered as much as 6.191 households. The number of samples calculated using the Slovin formula produced a minimum sample of 100 houses of residents who live in the area of South Cimahi Public Health Center and are willing to fill out the questionnaires. Exclusion was made for non-residents and residents who were not willing to fill out the questionnaire.

Evaluation ODF program was carried out by observing the house latrines and the environmental condition of the house according to the questions in the questionnaire. Evaluation of the PHBS program is carried out by interviewing and observing residents and their house environment. According to the criteria from WHO is the incidence of defecation disorder with a frequency of defecation more than three times in 24 hours with the consistency of stools softer or more watery, asked directly to know how many incidences of diarrhea in the last year. See Tables 1–3 below.

3. Results and Discussion

As many as 112 residents who met the inclusion criteria were involved in this study in February 2023. See Table 4 below.

Education is an important factor of education, shaping attitudes, perceptions, beliefs, and one's assessment of health. It could be assumed that a higher level of education is related to higher health awareness as they maintain their hygiene and environmental cleanliness [9,11]. There was 51,8% of respondents completed Senior High School, 31,3% completed Junior High School, and 11,6% are undergraduate/bachelors. This result shows that most of the respondents received sufficient formal education to know, shaping attitudes and healthy living behavior by implementing ODF and PHBS [9,11,12]. See Table 5 below.

TABLE 1: Open Defecation Free (ODF) verification criteria.

No.	Criteria	Yes or no	Explanation
1.	The toilet/latrine has a lid/cover so no insects around the toilet/latrine		If the latrine/toilet is in a goose-neck shape, then a lid is no longer needed.
2.	The distance between the septic tank and dug wells/water source is >10 meters		If < 10 meters, the septic tank must be watertight (eg concrete septic tank, bio septic tank, etc.)
3.	The squat part of the toilet is made of strong material		Not made of bamboo or weathered wood.
4.	Baby/elderly feces (if there is any) is flushed down the toilet		If there are sanitary pads/diapers then it is treated like waste.
5.	Every resident in the household uses the toilet		Observing the residents and environment
6.	Availability of anal cleansing		Depending on user habits such as the use of water and soap
7.	No human excrement is seen around the house, the yard, outside/nature, and the rivers		Observe

TABLE 2: Clean and Healthy Life Behavior (PHBS) indicator.

No.	Clean and healthy living behavior (PHBS) indicator	Yes	No
1.	Childbirth assisted by health workers		
2.	Exclusive breastfeeding (6 months)		
3.	Routine body weighing (Ideal weight)		
4.	Using clean water (odorless, colorless, tasteless)		
5.	Washing hands with clean water and soap		
6.	Using healthy latrines (clean toilet, no rats, septic tanks > 10 meters)		
7.	Eradication of mosquito larvae in the house		
8.	Consumes fruit and vegetables every day		
9.	Doing physical activity every day (15 – 30 minutes/day)		
10.	No smoking inside the house		

TABLE 3: Incidence of diarrhea.

In the last year experienced diarrhea?	
Yes	No

ODF can reduce or prevent the incidence of diarrhea. One of the influential environmental factors is poor environmental sanitation, including fecal disposal facilities. Indiscriminate disposal of feces can cause soil contamination and affect the supply of

TABLE 4: Respondent education characteristic.

Level of Education	Total	Percentage
Elementary School	6	5,4
Junior High School	35	31,3
Senior High School	58	51,8
Undergraduate/ Bachelor	13	11,6
Total	112	100

TABLE 5: Distribution of ODF behavior.

ODF	Total	Percentage
ODF	55	49,1
Not ODF	57	50,9
Total	112	100

clean water [9,11,12]. The result showed there are not quite some respondents who have not implemented ODF. See Table 6 below.

TABLE 6: Distribution of Clean and Healthy Living Behavior (PHBS).

PHBS	Total	Percentage
PHBS	18	16,1
Not PHBS	94	83,9
Total	112	100

The number of families that have implemented PHBS is shown in Table 3. Most of the respondents did not practice PHBS namely 83.9% and the rest 16.1% had PHBS. The assessment is based on a questionnaire with ten indicators with conditions that all points must be met to complete the criteria called implementing PHBS.

A person’s clean and healthy living behavior (PHBS) is closely related to improving the health status of individuals, families, communities, and their environment. Healthy behavior in daily life will protect us from various diseases, especially infectious common diseases such as diarrhea [9,11,12]. The result shows there are still very few respondents aware of living a clean and healthy life in the South Cimahi Public Center area. See Table 7 below.

Table 7 describes there were many respondents have experienced diarrhea in the last year. As many as 81 respondents or 72.3% answered that they ever had diarrhea and only 27.1% had not. We asked directly to respondents about the signs and symptoms of diarrhea based on established criteria by WHO.

TABLE 7: Incidence of diarrhea within the last year in the respondent family.

Diarrhea	Total	Percentage
Diarrhea	81	72,3
No Diarrhea	31	27,7
Total	112	100

Diarrhea is characterized by 3 times or more frequency of defecation in 24 hours with the consistency of stool being more liquid than usual. This disease can be caused by bacterial, viral, and parasitic infections. Infection transmission through contaminated food or drinking water. Diarrhea could be caused by many other factors besides infection [2,13-16]. The etiology of multifactorial diarrhea will not discussed in this study.

3.1. Analysis of the relationship between Open Defecation Free (ODF) and diarrhea

Table 8 below shows the result of the Chi-Square test to determine the relationship between ODF behavior and the incidence of diarrhea within the last year.

TABLE 8: Relationship between ODF behavior and diarrhea incidence.

Variable	Diarrhea				Total	p-value
	Yes		No			
	n	%	n	%		
ODF						
Yes	24	43,6	31	56,4	55	0,000
No	57	100	0	0	57	
Total	81	72,3	31	27,7	112	

The result of analyzing the relationship between the implementation of ODF and the incidence of diarrhea shows a significant p-value (P= 0,000). It can be concluded that there is a significant difference proportion amount of diarrhea cases between respondents who implemented and respondents who did not implement ODF behavior.

It is my theory that ODF behavior can reduce or prevent diarrhea. One of the influential environmental factors is poor environmental sanitation, including fecal disposal facilities. Indiscriminate disposal of feces would contaminate soil and affect the supply of clean water. Those factors could cause people to get waterborne diseases such as diarrhea [12,17-21].

Febryani in her study also had the same conclusion which proves the relationship between latrine ownership, the condition of latrine sanitary, the distance from the water source to a septic tank, and the use of latrine by all family members with the incidence of diarrhea [22].

3.2. Analysis of the relationship between Clean and Healthy Living Behavior (PHBS) and Diarrhea

The Table 9 below was the result of the Chi-Square test to determine the relationship between PHBS behavior and the incidence of diarrhea within the last year.

TABLE 9: Relationship between PHBS and diarrhea incidence.

Variable	Diarrhea				Total	p-value
	Yes		No			
	n	%	n	%		
PHBS						
Yes	0	0	18	100	18	0,000
No	81	86,2	13	13,8	94	
Total	81	72,3	31	27,7	112	

The Table 9 showed that the relationship between the implementation of PHBS and the incidence of diarrhea is significant with a p-value of 0,000 after Chi-square analysis. Therefore it can be concluded that there is a significant difference proportion amount of diarrhea cases between respondents who implemented and respondents who did not implement PHBS behavior.

The result is the theory that an individual's clean and healthy lifestyle is closely related to an increased health status of individuals, families, communities, and their environment. It is clearly explained that implementing clean and healthy living behavior will prevent us from various common diseases, especially infectious diseases such as diarrhea [8-10,23].

Anggraini proves in her study that, the population who has not implemented PHBS has ten times the risk of suffering from diarrhea compared to the population that implementing PHBS. Therefore, it can be concluded that there is a significant relationship between PHBS and the incidence of diarrhea in children under five years old [8,10,17,23].

3.3. Researchers limitation

The limitation of this study is the presence of some confounding cause factors for diarrhea outside of this study such as people who have low immunity, comorbidities, or others. We only put information on the history of diarrhea without asking about other causative factors. In this study, intervention cannot be carried out before filling out the questionnaire.

4. Conclusion

There 50.9% of families have not implemented ODF behavior while 49.1% of families have implemented it.

There 83.9% of families have not implemented PHBS while 16.1% of families have implemented PHBS.

The incidence of diarrhea within the family in the last year is 72.3% and the other 27.1% family has no experience.

There was a relationship between ODF behavior and the incidence of diarrhea in the last year ($p=0,000$). Families who have not implemented ODF had 100% of diarrhea. Families who have implemented ODF and have had no experience of diarrhea within one last year are 56.4%.

There is a relationship between PHBS and the incidence of diarrhea in the last year ($P = 0,000$). As much as 86.2% of families who have not implemented PHBS had 100% diarrhea. The rest families who have implemented PHBS and have had no experience of diarrhea within the last year are 100%.

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