(RESEARCH ARTICLE)

Analysis of the relationship of environmental sanitation with the incidence of Dengue Haemorrhagic Fever (DHF) in Mayangrejo Village, Kalitidu District, Bojonegoro Regency

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Abstract

Dengue Hemorrhagic Fever (DHF) is transmitted to humans through the bite of the Aedes aegypti mosquito which can transmit the dengue virus. Dengue Hemorrhagic Fever (DHF) is a type of infectious disease whose number of sufferers and its distribution tends to increase and spread in Indonesia. Factors that influence the occurrence of Dengue Hemorrhagic Fever (DHF) include environmental factors, age, knowledge, attitudes, and behavior. This study aims to determine the relationship between family support (interpersonal) and risky behavior with the incidence of Dengue Hemorrhagic Fever (DHF) in Mayangrejo Village, Kalitidu District, Bojonegoro Regency. An analytic study with a cross sectional design with a population of 3.024 people. Sampling was carried out using the stratified sampling method and obtained a sample of 67 respondents. Collecting data using a questionnaire distributed to residents' homes and data analysis using the Chi-Square Test. Of the 67 respondents, the majority are residents with an elementary education category of 56.72%, ages 21-40 and 41-60 years respectively are 44.78%, location of residence in Gempol is 43.28%, female is 62.69%, not working 61.19%, environment sanitation good is 46,27%, environment sanitation bad is 53,73%. The results of the Chi-Square Test analysis between enviornment sanitation with the incidence of Dengue Hemorrhagic Fever (DHF) in Mayangrejo Village, Kalitidu District, Bojonegoro Regency showed pvalue = 0.029, which means that there is a relationship between the two because of the p-value <0,05.

Keywords: Dengue Hemorrhagic Fever (DHF); Environment; Sanitation; Health; Chi-Square Test

1. Introduction

Dengue hemorrhagic fever (DHF) is transmitted to humans through the bite of the Aedes aegypti mosquito, which can transmit the dengue virus. DHF is a type of infectious disease that has a large number of sufferers, and its distribution tends to increase and expand in Indonesia. Based on the data according to the Ministry of Health of the Republic of Indonesia [1], dengue fever cases have spread to 472 cities. In 34 provinces, deaths due to dengue fever occurred in 219 cities, and 377 (73.35%) cities have achieved an incident rate (IR) of less than 49/100,000 population.

East Java Province is a high cluster in the spread of dengue fever cases [2]. The increase in dengue cases has become a major health problem, one of which is in Mayangrejo village, Kalitidu District, Bojonegoro Regency. According to the official website of PEMKAB Bojonegoro [3], at the end In October 2019, there were 404 cases of dengue fever with 7 patients died. In 2018, there were 589 dengue fever cases with 12 patients died. According to Chief Division of Disease Prevention and Control at the Bojonegoro District Health Service, Dr. Whenny Dyah Prajanti [4], dengue fever cases are spread across 20 sub-districts, most of which are endemic areas where every year there are always cases and never zero.

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The breeding place for the Aedes aegypti mosquito is a reservoir of clear water somewhere or containers that are both indoors and outdoors [5]. Left water Stagnant water can become a breeding ground for Aedes aegypti mosquitoes. The mosquito population will increase if climate change or transition occurs. DHF cases are closely related to aspects of environmental sanitation that cause the availability of breeding places for Aedes aegypti mosquito vector. Environmental sanitation behaviour in efforts to prevent dengue fever is one of the related issues in the management of water reservoirs, waste management, and the 3M plus movement.

Research related to sanitation facilities carried out by Calesta and Fitriyah [6] in one of the villages in Bojonegoro stated that there is a need for the availability of latrines and waste water disposal facilities as well as the socialisation of waste management. Supported by research by Elder and Lloyd [7], it was stated that there was a concomitant increase in dengue fever cases in Kediri City (East Java). with poor environmental sanitation. Poor environmental sanitation behaviour can occur due to a lack of practice and community involvement in maintaining environmental cleanliness. Therefore, this research is intended to determine the relationship between environmental sanitation and incidents of DHF in Mayangrejo Village, Kalitidu District, Bojonegoro Regency.

2. Material and methods

This research is a descriptive analytical research that is quantitative in nature. According to Notoatmodjo [8], a cross-sectional survey is research to study the dynamics of the correlation between risk factors and effects. By approaching, observing, or collecting data simultaneously on a certain moment or period. The population in this research is the residents of Mayangrejo Village. There are 3024 people living in Gempol, Slembi, and Ngenden Hamlets, while the sample calculation involves as many as 67 people with a sampling technique, namely stratified sampling. Internal variables in this research consist of an independent variable, which is the level of environmental sanitation, while the dependent variable is the incidence of dengue fever in Mayangrejo Village.

Data collection in this research used a distributed questionnaire research instrument from door to door. The environmental sanitation variable category is divided into two categories: namely, good and bad. Meanwhile, the DHF incidence variable is divided "DHF" (suffering from dengue fever) and "No DHF" (not suffering from dengue fever). Then the data is poured into the table of frequency distribution for univariate analysis and the Chi Square Test using SPSS for bivariate analysis. The Chi-Square test is a non-parametric statistical test that is most widely used in research in the field of public health, because this test has the ability to compare two groups or more in categorised data [9]. This research also obtained ethical permission from the Department of Public Health, Airlangga University.

3. Results

3.1. Respondent Characteristics

In Table 1, the characteristics of respondents are presented which include education, age, location of residence, gender, and occupation.

Table 1 Respondent Characteristic

SN.	Respondent Characteristics	Frequency	Percentage (%)
	Education Level		
1	Never attended school	3	4.48%
2	Elementary School	38	56.72%
3	Junior High School	16	23.88%
4	Senior High School	9	13.43%
5	Bachelor's degree or higher	1	1.49%
	Total	67	100.00%
	Age		
1	<=20	0	0.00%

2	21-40	30	44.78%
3	41-60	30	44.78%
4	>60	7	10.45%
Total		67	100.00%
Hamlet location			
1	Slembi	32	48.00%
2	Gempol	29	43.28%
3	Ngenden	6	8.96%
Total		67	100.00%
Sex			
1	Male	25	37.00%
2	Female	42	62.69%
Total		67	100.00%
Job			
1	Has a Job	26	39.00%
2	Does not has a Job	41	61.19%
Total		67	100.00%

Source : Primary Data

Based on the data from Table 1, it shows that there are 5 categories of final education level among a total of 67 respondents, namely not attending school as many as 3 respondents (4.48%); Elementary School as many as 38 respondents (56.72%); junior high school as many as 16 respondents (23.88%); Senior High school as many as 9 respondents (13.43%); and Bachelor's degree or higher as much as 1 respondent (1.49%). The age of the respondents is shown as no respondents (0%) in the range <=20 years old; in the age range 21–40 years old, there are as many as 30 respondents (44.78%); in the age range 41–60 years old, there are 30 respondents (44.78%); and in the age range >60 years old, there are 7 respondents (10.45%). The location of Hamlet is spread across 3 hamlets, namely 32 respondents (48%) are located in Slembi Hamlet, 29 respondents (43.28%) are located in Gempol Hamlet, and 6 respondents (8.96%) are located in Ngenden Hamlet. Whereas, based on gender, there are 25 male respondents (37%) and 42 female respondents (62.69%). If we look at the job categories, they are divided into 2, namely 26 people have a job (39%) and people that have a job as many as 41 respondents (61.19%).

3.2. The Incidence of Dengue Hemorrhagic Fever (DHF) In Mayangrejo Village

In Table 2, the frequency and percentage of Dengue Hemorrhagic Fever (DHF) incidents in the Mayangrejo village are presented.

Table 2 The Incidence of Dengue Hemorrhagic Fever (DHF) In Mayangrejo Village

SN.	The Incident of DHF Cases	Frequency	Percentage (%)
1	DHF	22	32.84%
2	No DHF	45	67.16%
Total		67	100.00%

Source : Primary Data

Table 2 shows the incidence of dengue fever in Mayangrejo Village. Among of 67 respondents, there are 22 people (32.84%) who suffer from dengue fever and 45 people (67.16%) who do not suffer from dengue fever.

3.3. Respondent's Environmental Sanitation Condition

In Table 3, the frequency and percentage of respondent's environmental sanitation condition in the Mayangrejo village are presented.

Table 3 Respondent's Environmental Sanitation Condition

SN.	Respondent's Environmental Sanitation Condition	Frequency	Percentage (%)
1	Good	31	46.27%
2	Bad	36	53.73%
Total		67	100.00%

Source : Primary Data

Table 3 shows that environmental sanitation conditions are divided into 2 categories, namely good and bad. Of the total 67 respondents, there are 31 respondents (46.27%) with a good condition of environmental sanitation and 36 people (53.73%) with a bad condition of environmental sanitation.

3.4. Relationship between Environmental Sanitation and DHF Incidents in Mayangrejo Village

In Table 4, the results of the bivariate analysis of the relationship between environmental sanitation and incidents of Dengue Hemorrhagic Fever (DHF) in Mayangrejo Village are shown.

Table 4 Relationship between Environmental Sanitation and DHF Incidents

SN.	Environmental Sanitation	The Incident of DHF Cases				Total		P-value
		DHF		No DHF				
		F	%	F	%	F	%	
1	Good	6	27%	25	56%	31	46%	
2	Bad	16	73%	20	44%	36	54%	0.029
Total		22	100%	45	100%	67	100%	

Source: Primary Data

Based on the data in Table 4, it is known that of the 22 respondents who suffer from dengue fever, there are 6 respondents (27%) with good environmental sanitation conditions and 16 respondents (73%) with bad environmental sanitation conditions. Based on 45 respondents who suffer from dengue fever, there are 25 respondents (56%) with good environmental sanitation conditions and 20 respondents (44%) with bad environmental sanitation conditions. Then, we conducted a chi-square test indicating a relationship between the sanitation environment and the incidence of dengue fever in Mayangrejo Village (p-value <0.05) with a p-value of 0.029.

4. Discussion

4.1. Respondent Characteristics

Based on education level, most of the respondents in this study have elementary school education level (38 people or 56.72%). Furthermore, based on the age of the respondents, the results showed that the majority of respondents were aged 21–40 years old (44.78%) and 41-60 years old (44.78%). Then, based on gender, the majority of respondents in this study are women (42 people or 62.69%). And based on Job categories, the results showed that the majority of respondents do not have a job (41 people or 61.19%).

4.2. Respondent's Environmental Sanitation Condition

Based on univariate analysis regarding the sanitation conditions of the respondents' environment, the results showed that the majority of respondents had bad environmental sanitation conditions, namely 36 respondents or 53.73%. From these research results, it can be concluded that the level of environmental sanitation of the respondents is sufficient low. The researcher's assumption is that there is a relationship between the sanitation conditions of the respondent's environment and the numbers dengue fever incidents that occurred in the respondent's area. This is in line with the

research conducted by Prasetyo [10] who said that respondents with bad sanitation conditions could are 3.65 times more likely to suffer from dengue fever compared to respondents who have good sanitation conditions. This is also supported by the research conducted by Chairil [11] that environmental sanitation conditions can play a role in influencing the risk of dengue fever.

4.3. Relationship between Environmental Sanitation and DHF Incidents in Mayangrejo Village

Based on the results of this research, it was found that there are a significant relationship between environmental sanitation conditions and the incidence of dengue fever in Mayangrejo Village with a p-value of 0.029 (p < 0.05). This is in line with research by Anisa Anggraini [12], which found that the p-value was 0.000, which means there is a significant influence between environmental sanitation conditions and the incidence of dengue fever in Purwoharjo District. Not only that, research conducted by Qoriatus Sholihah [13] also stated that from the calculation results, a p-value was obtained of 0.012, which means there is a significant relationship between environmental sanitation conditions and the incidence of dengue fever in Lontar Village. Likewise, research conducted by Rahmad Riski Fauji [14] stated that based on the results of statistical tests, it was found that the P value was 0.000 < α 0.05, meaning that there was a significant relationship between environmental sanitation and the incidence of dengue fever in the Dirgahayu Community Health Center Working Area, Kotabaru Regency.

Sanitation is a deliberate behaviour to promote clean living and aims to prevent people from coming into direct contact with dirty and dangerous materials, this behavior is an effort that is expected to maintain and improve public health. So, it can be said that sanitation is an effort made by the community to guarantee and create conditions that meet health requirements [15]. According to Ehler and Steel in Boekoesoe [16], "Environmental sanitation is an effort to prevent the occurrence of a disease by eliminating or regulating environmental factors related to the chain of disease transmission." Based on this understanding, environmental sanitation has a big role in ensuring a healthy environment, the better the environmental sanitation, the better the environmental guarantee for living creatures in it.

From the description above, in dealing with dengue fever, it is very important to pay attention to disease vectors originating from the environment, so that vectors and sanitation are an interconnected unit. In efforts to deal with dengue fever, the scope of environmental sanitation is managed as stated by Notoatmodjo in L. Boekoesoe [17] that "Environmental sanitation factors that cause environmental health problems in developing countries include housing, provision of drinking water, waste disposal, disposal of waste water (dirty water) and latrines (disposal of human waste)". Just like research conducted by Anisa Anggraini [18], the influence of environmental sanitation conditions on the incidence of dengue fever in Purwoharjo District is supported by the factors of containers for daily necessities, containers around the house, ventilation, lighting, and residential density.

The incidence of dengue fever is closely related to the sanitary conditions of the home environment, which has the potential to become a breeding ground for the Aedes aegypti mosquito. According to Prasetyo [19] who stated that respondents with bad sanitation conditions have a 3.65 times greater risk of contracting dengue fever compared to respondents who have good sanitation conditions. Supported by research conducted by Chairil [20], environmental sanitation conditions can play a role and influence the incidence of dengue fever. Several factors in environmental sanitation influence the incidence of dengue fever, such as water reservoirs, rubbish disposal, lighting, and the presence of larvae. Meanwhile, according to research by Dompas [21], it was stated that respondents who had water reservoirs that did not meet the requirements had a 6.41 times greater potential or risk of contracting dengue fever. Apart from that, poor waste disposal and management systems can also potentially cause dengue fever [22]. The lighting factor is another factor in the condition of the home environment with the potential for dengue fever to occur [23,24]. Meanwhile, the presence of larvae in the home environment has a 6.35 times greater risk of contracting dengue fever compared to a home environment where there are no Aedes aegypti larvae.

Based on this discussion, it can be seen that there is a relationship between environmental sanitation conditions and the incidence of dengue fever. This is of course in line with the results of this research which show that there is a significant relationship between environmental sanitation conditions and the incidence of dengue fever in Mayangrejo Village.

5. Conclusion

Based on the analysis of the results and discussion, it can be concluded that the results of the Chi-Square Test show that there is a significant relationship between environmental sanitation and the incidence of dengue fever in Mayangrejo Village, Kalitidu District, Bojonegoro Regency in 2022 with a p-value of 0.029 (p-value <0.05).

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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