

Relationship of Waste Management towards the Event of DHF in the Work Area of Puri Health Center, Mojokerto Regency in 2021

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Abstract

Dengue Hemorrhagic Fever (DHF) is one of the main public health problems in Indonesia. This disease is caused by the dengue virus and is transmitted through the bite of the *Aedes aegypti* and *Aedes albopictus* mosquitoes. DHF has spread widely throughout Indonesia, one of which is Mojokerto and its surroundings. From 2014 to 2021, the incidence rate (IR) of dengue fever in Mojokerto has increased and decreased. However, dengue cases always appear, especially in endemic areas such as Mojokerto. This study aims to analyze the relationship between waste management practices and the incidence of dengue fever in Mojokerto Regency. This research is an analytic observational study with a case control approach. The sample of the case group in this study were DHF patients at the Puri Public Health Center, Semarang Regency and the control group were healthy people or neighbors of DHF patients who lived in Mojokerto. The research sample was 27 cases and 27 controls with consecutive sampling technique. The data were processed by chi-square test. From the statistical test, it is known that there is a relationship between waste management practices ($p = 0.003$) and the incidence of DHF in Semarang Regency.

Keywords

Dengue; hemorrhagic fever;
Waste disposal practices



I. Introduction

Dengue Hemorrhagic Fever (DHF) or Dengue Hemorrhagic Fever (DHF) is an infectious disease that is prioritized in disease prevention and eradication programs. Dengue fever is an acute febrile disease that has the potential to cause death. This disease is transmitted through the bite of vectors of *Aedes aegypti* and *Aedes albopictus* mosquitoes that are infected by the dengue virus which is transmitted by female *Aedes aegypti* mosquitoes and is currently a public health problem in Indonesia which tends to increase the number of patients and its spread is wider. Dengue fever is found in almost all parts of the world, especially in tropical and subtropical countries, both as endemic and epidemic diseases (Asmadi, 2015).

Dengue Hemorrhagic Fever (DHF) is transmitted to humans through the bite of infected mosquitoes, especially the *Aedes aegypti* and *Aedes albopictus* mosquitoes, which are found in almost all corners of Indonesia. The natural host of DHF is humans and the agent is Dengue virus which belongs to the family Flaviridae and genus Flavivirus, which consists of 4 serotypes, namely Den-1, Den-2, Den-3 and Den-4 (Kurane I., 2017). In the last two months of 2021, cases of Dengue Hemorrhagic Fever (DHF) in Mojokerto Regency were recorded to have increased. Precisely in the period November to December 2021. Data from the local Health Service (Dinkes), cases of DHF in Mojokerto Regency throughout 2021 or until December 27, 2021 totaled 68 cases. This number increased sharply in December 2021 compared to the previous month. DHF is still an endemic disease in Mojokerto Regency with

various types of risk factors that support the transmission of DHF (Dinas Kesehatan Kabupaten Mojokerto, 2021).

The triad of epidemiology explains the relationship between three main factors that play a role in the occurrence of diseases and health problems, namely the host (host), agent (causative factor), and environment (environment) (Notoatmodjo, 2012). Community behavior in maintaining the cleanliness of the environment around the house is one of the factors related to dengue fever. Research conducted by Rusmini M. Arsyad (2020) explains that there are still many DHF sufferers who dispose of waste improperly. The practice of throwing garbage here is closely related to the presence of *Ae. aegypti* as a vector for dengue fever.

The practice of throwing garbage here is closely related to the presence of *Ae. aegypti* as a vector for dengue fever. This is because the mosquito *Ae. aegypti* can breed in garbage. This is closely related to how the community manages waste. Research conducted by Astuti EP, (2016) conducted in West Java shows that most people still process waste using the burning method, where waste can be used as a breeding ground for *Ae. aegypti* is waste that is included in the category of non-combustible waste.

The purpose of this study was to describe the characteristics of dengue cases that occurred in 2021 as the latest year recorded by the Mojokerto District Health Office, which was indeed the final result of the cases that occurred and to find out the relationship between waste management and the incidence of dengue fever in Mojokerto Regency in 2021.

II. Review of Literature

2.1 Definition of Dengue Fever

Dengue Hemorrhagic Fever (DHF) is a disease caused by the dengue virus belonging to the Arthropod - Borne Virus, the genus *Flavivirus*, and the family *Flaviviridae*. DHF is transmitted through mosquito bites from the genus *Aedes*, especially *Aedes aegypti* or *Aedes albopictus*. Dengue fever can appear throughout the year and can affect all age groups. This disease is related to environmental conditions and people's behavior (DepKes RI, 2015).

Dengue Hemorrhagic Fever (DHF) is a viral disease with acute fever, characterized by sudden onset, fever between 3 - 5 days (rarely more than 7 days) severe headache, myalgia, arthralgia, retro-orbital pain, anorexia. Maculopapular spots or rashes are usually present, and minor bleeding such as nosebleeds, bleeding from the gums occurs during fever. (Saruji, 2013).

2.2 Mechanism of DHF Transmission

The factors that play a role in the transmission of dengue virus infection are humans, intermediary vectors and the environment. The dengue virus is transmitted to humans through the bite of the *Aedes aegypti* mosquito. The *Aedes* mosquito contains the dengue virus when it bites a human who is experiencing viremia. Then the virus in the salivary glands reproduces within 8 - 10 days (extrinsic incubation period) before it can be transmitted back to humans in the next bite. Viruses in the body of female mosquitoes can be transmitted to their eggs (transovarial transmission) but their role is not important (Saruji, 2013).

Once the virus can enter and reproduce in the mosquito's body, the mosquito will be able to transmit the virus throughout its life (infective). In the human body, the virus takes 4-6 days to germinate (intrinsic incubation period) before causing disease. A person in their blood contains the dengue virus which is a source of transmission of dengue disease. The dengue virus is in the blood for 4-7 days after 1 to 2 days of starting a fever. If the patient is bitten by a transmitting mosquito, the virus in the blood will also be sucked into the mosquito's stomach. Furthermore, the virus will multiply and spread in various tissues of the mosquito's body, including the salivary glands. This transmission can occur every time a mosquito stabs (bites),

before sucking blood, the mosquito will salivate through the stab channel (proboscis), so that the sucked blood does not clot. It is with this saliva that the dengue virus is transferred to other people (RI, 2015).

2.3 Definition of Garbage

In Law No. 18 of 2008 concerning Waste Management, the definition of waste is the rest of human daily activities and/or natural processes in solid form. Meanwhile, according to the definition of the World Health Organization (WHO) waste is something that is not used, not used, not liked or something that is thrown away that comes from human activities and does not happen by itself (Candra, 2006).

In the Environmental Dictionary (www.menlh.go.id) waste has two meanings, namely (1) materials that have no value or value for ordinary or primary purposes in manufacturing or use, damaged or defective goods in manufacture (manufacturing), or excess or rejected or discarded material, and (2) waste (garbage/waste); the regular process of removing useless or unwanted materials.

2.4 Waste Management Concept

According to Law Number 18 of 2008 concerning Waste Management (UUPS), what is meant by waste is the residue of human daily activities and/or natural processes in solid form. Garbage which is the rest of human activities must be managed so as not to cause environmental pollution and health problems. Waste management is a systematic, comprehensive, and sustainable activity that includes waste reduction and handling. Waste reduction referred to in the UUPS includes activities to limit waste generation, recycle waste, and reuse waste. To be able to realize these activities, the community and business actors in carrying out their activities are expected to use materials that cause as little waste as possible, can be reused, can be recycled, and are easily decomposed by natural processes. Waste management as referred to in the UUPS is an activity that begins with sorting in the form of grouping and separating waste according to the type, amount, and nature of the waste.

Environmental Protection and Management, and other regulations; Zero Waste (has an integrated waste processing system); Zero Run-off (using an eco-drainage system where all surface water must be absorbed back into the ground); Green Infrastructure (availability of pedestrians and lanes for bicycles); Meets 30% area for Green Open Space from city area (20% for Public and 10% for Private); Green Building; Green Transportation (the availability of environmentally friendly mass transportation, the use of non-fuel transportation such as bicycles, delman, rickshaws and the community is actively on foot); Community Participation Rate through the establishment of Green Community. (Tobing R, et al. 2021)

The next step is the collection and transfer of waste from the waste source to the temporary storage site, and transportation of the waste from the temporary waste storage site to the final processing site. Then the waste that has been collected at the final processing site is managed by changing the characteristics, composition, and amount of waste and/or processed to return the results of previous processing to environmental media safely.

In general, waste management in urban areas is carried out through 3 stages of activities, namely collection, transportation and final disposal. Alfiandra (2009) describes in simple terms the stages of the activity process in waste management as follows:

- a. Collection is defined as the management of waste from its place of origin to a temporary disposal site before moving on to the next stage. At this stage, assistance facilities are used in the form of trash cans, trash bins, garbage containers, wheelbarrows, or temporary dumps. To carry out the collection, it generally involves a number of personnel who collect waste every certain period of time;

- b. Transportation, namely transporting waste by using assistance in the form of certain means of transportation to the final disposal/processing site. This stage also involves personnel who at a certain period of time transport waste from temporary disposal sites to final disposal sites (TPA);
- c. Final disposal, where the waste will undergo physical, chemical and biological processing until the completion of the entire process.

2.5 Community Behavior in Waste Management

In the context of waste management, community participation can be in the form of separating organic waste and inorganic waste in the storage process, or through making compost on a family scale and reducing the use of non-biodegradable items (Yolarita, 2011).

According to Chandra (2012) revealed that the concept of participation can be measured through the planning stage, implementation stage, and utilization stage. When related to waste management, community participation in waste management is not only seen from the participation of the community in the implementation process of managing waste, but also participating in being a member of organizations related to waste problems that play a role in planning a good waste management system. Community participation in waste management can be in the form of indirect participation. What is meant by indirect participation is community involvement in financial matters, namely participation in waste management by paying a retribution for waste services through the relevant agencies that directly provide services in cleaning.

Community participation can be classified into two groups, namely direct participation and indirect participation. Direct participation in the form of reducing the use of materials that are difficult to decompose, sorting waste, transferring waste from waste sources to temporary shelters, reusing waste, and cleaning activities such as mutual cooperation for community service in the neighborhood. Indirect participation can be in the form of paying a waste retribution, attending counseling/training on waste management, and providing advice/criticism to RT/RW related to the community waste management system (Yulastuti, 2013).

III. Research Methods

This research is an analytical survey with a cross sectional study approach. The research was conducted in the working area of Puri Public Health Center, Mojokerto Regency. Research variables include knowledge about waste management and the incidence of dengue fever.

This research is an observational research with analytical study method. The research design used is a case control approach. The case population in this study were all inpatients of DHF in the period January – December 2021 at the Puri Health Center, Mojokerto Regency. While the control population is all people who do not suffer from DHF who live in Mojokerto Regency (neighbors of sufferers). The sample consisted of 27 cases of DHF and 27 controls using consecutive sampling technique.

Primary data in this study were obtained through interviews with respondents using questionnaires and observations or observations recorded on the observation sheet. The questionnaire contains 4 questions about the habits and practices of respondents in disposing of waste, while the observation sheet is used as supporting data for researchers to see the environmental conditions around the respondent's house to see whether there is garbage. Secondary data was obtained from data on DHF patients at the Puri Health Center, Mojokerto Regency in the form of biodata (name and address) and patient history.

IV. Results and Discussion

4.1. Characteristics of Respondents

Based on table 1 below, it can be explained that the education level of respondents in the case group with the most is elementary school graduates as many as 10 people with a percentage of 37.03% and the least is a college graduate as many as 1 person with a percentage of 3.70%. In the control group, the education level of the most respondents is high school graduates as many as 9 people with a percentage of 33.33% and the least is not finishing elementary school as many as 2 people with a percentage of 7.41% and graduating from college as many as 2 people with a percentage of 7.41%. The type of work of the respondents in the case group was mostly students as many as 9 people with a percentage of 33.33% and the least was PNS/ABRI as many as 2 people with a percentage of 7.41%. While the type of work in the control group is mostly students as many as 8 people with a percentage of 29.63% and the least is self-employed as many as 4 people with a percentage of 14.81% and private employees as many as 4 people with a percentage of 14.81%.

Table 1. Distribution of Respondents Characteristics				
Characteristics of respondents	DHF incident			
	Case		Control	
	N	%	N	%
Level of education				
Not completed in primary school	5	18,52	2	7,41
Finished elementary school	10	37,03	8	29,63
Graduated Middle School	4	14,81	6	22,22
High school graduate	7	25,92	9	33,33
College Graduate	1	3,70	2	7,41
Total	27	100	27	100
Type of work				
PNS	2	7,41	0	0
Entrepreneur	3	11,11	4	14,81
Private employees	4	14,18	4	14,81
Housewife	2	7,41	5	18,52
Student	9	33,33	8	29,63
Total	27	100	27	100

4.2. Relationship between Waste Management and Dengue Hemorrhagic Fever

The results of the analysis of the relationship between waste management and the incidence of dengue are listed in table 2 below:

Table 2. The Relationship between Waste Management and Diarrhea in the Work Area of the Puri Health Center, Mojokerto Regency.

Pan Health Center, Mojokerto Regency.					
Waste management	DHF Incident				P-Value
	Case		Kontrol		
	n	%	n	%	
Good	13	48,1	20	74,1	0,003
Bad	14	59,9	7	27,9	
Total	27	100	27	100	

Based on the results of the data analysis above, it is known that there is a relationship

between waste management and the incidence of dengue fever in the working area of the Puri Public Health Center, Mojokerto Regency. The results of the analysis showed that respondents who had cases or who had suffered from DHF were known to have bad waste management attitudes as many as 14 people with a percentage of 59.9% and in control respondents it was known that 7 people had poor knowledge about waste management with a percentage of 27.9%.

Notoatmodjo (2003) states that there are 2 forms of a person's behavior, namely active behavior and passive behavior. Active behavior such as the respondent's behavior towards efforts to prevent the occurrence of dengue can take the form of actions to increase knowledge about dengue disease, efforts to clean the house or outside the house, while passive behavior is the behavior of respondents who tend to rarely clean the house even though they have knowledge of dengue disease.

Practice is a form of attitude that has not automatically manifested in an action (over behavior). One of the practices in preventing dengue fever is to keep the environment clean by disposing of garbage in its place. Garbage that can be used as a breeding place is waste that is included in the non-combustible category, namely waste in the form of used cans, used bottles and broken glass and others (Notoadmodjo, 2012). These used goods can be a breeding ground for *Ae. aegypti* because it can hold water or become a place for puddles when it rains if proper and proper waste management is not carried out (DepKes RI, 2015). The absence of routine transportation so that waste is stored longer in the trash provides an opportunity for *Ae. Aegypti* (Adytama, dkk, 2014). Therefore, it is necessary to eradicate it by way of one of them by burying or burning and getting rid of it (Abdul, 2012).

Based on the results of observations in the field, it shows that the waste produced by respondents in both the case and control groups is included in domestic waste (household waste) which contains a lot of organic waste (easy to decompose). Non-organic waste (garbage that does not decompose easily or cannot decompose) such as used bottles, used cans, and used tires is not often found inside or outside the respondent's house. This type of waste is garbage that has the potential to become a breeding place for mosquitoes. When the number of breeding places increases, the risk of transmission of dengue disease will also increase.

This research is in line with the research conducted Wulandari DA, (2016) who concluded that there was a relationship between 3M plus behavior and the incidence of dengue fever in the Dusun Branjangan Manisrenggo Klaten. In line with the research conducted Anggraini A (2016) which concludes that there is a significant influence between the behavior of 3M Plus on the incidence of Dengue Hemorrhagic Fever in Purwoharjo District, Banyuwangi Regency. However, this study is not in line with the results of research conducted by Fitriani et al., (2020) The study was conducted in the city of Semarang with a sample of 18 cases and 18 controls, indicating that there is no relationship between the practice of disposing of garbage and the incidence of dengue fever, which is indicated by the value of $p = 0.289$.

V. Conclusion

1. The education level of the respondents in the case group with the highest number of students graduated from elementary school as many as 10 people (37.03%) and the least one graduated from D3/S1 (3.70%). In the control group, the education level of the most respondents was high school graduates as many as 9 people (33.33%) and at least 2 people did not graduate from elementary school (7.41%) and 2 people graduated from D3/S1 (7.41%). The type of occupation of the respondents in the case group was mostly students as many as 9 people (33.33%) and the fewest were civil servants/ABRI as many as 2 people (7.41%). While the types of work in the control group were mostly students as many as 8 people (29.63%) and the least were entrepreneurs as many as 4 people (14.81%) and private

- employees as many as 4 people (14.81%).
2. There is a relationship between waste management and the incidence of Dengue Hemorrhagic Fever in Mojokerto Regency which is indicated by the p value = 0.003.

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