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# **The Relationship Between Mosquito Breeding Sites and Waste Management with the Incidence of Dengue Hemorrhagic Fever (DHF) in Citimun Village, Cimalaka District in 2023**

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**Abstract:** Dengue is a viral disease transmitted by *Aedes* mosquitoes. There are four types of dengue virus (DENV-1, DENV-2, DENV-3, DENV-4), and infection with one type provides lifelong immunity against only that type. One of the factors that can influence the increase in morbidity and death rates due to dengue disease is poor community behavior related to poor environmental sanitation. This study aims to determine the relationship between mosquito breeding sites and waste management with the incidence of *Dengue Hemorrhagic Fever* (DHF) in the Citimun Village Area. The type of research used is quantitative research that is descriptive analytic with a *cross sectional* approach. The population in this study is the population of Citimun Village which amounts to 5,274 households, with a sample number of 100 families determined by the slovin formula. The data analysis used was univariate and bivariate data analysis using the Chi-Square test. The results showed that there was a relationship between mosquito breeding sites and dengue incidence with a p-value of 0.001, and there was a relationship between waste management and dengue incidence with a p-value of 0.006. It is hoped that village officials and epidemiological surveillance officers at puskesmas can provide counseling to the community so that the community can maintain good environmental cleanliness and to avoid disease.

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**Keywords:** Dengue Hemorrhagic Fever, Mosquito Breeding Grounds, Waste Management

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## **1. Introduction**

Dengue is a viral disease transmitted by *Aedes* mosquitoes. There are four types of dengue virus (DENV-1, DENV-2, DENV-3, DENV-4), and infection with one type provides lifelong immunity against only that type. However, a different type of infection can then cause more severe symptoms. Dengue hemorrhagic fever (DHF) is a more serious form of dengue disease. This happens when someone who is already infected with the dengue virus is then infected again with a different strain. Dengue Hemorrhagic Fever (DHF) can cause organ damage and even death if not treated properly (WHO, 2020).

One of the factors that influence the incidence of dengue fever is poor environmental sanitation. Poor environmental sanitation is shown by not draining water reservoirs once a week, not keeping larva-eating fish, flower vases with standing water, leaving used items that can collect rainwater and not burying used goods. One of the factors that can influence the increase in morbidity and death rates due to dengue disease is poor community behavior related to poor environmental sanitation. Environmental sanitation behaviors related to dengue incidents include: Water reservoir treatment, waste treatment and the 3M Plus movement (Rusmini, 2020).

In 2020, WHO reported that around 3.3 million dengue cases occurred worldwide. This data shows a significant increase compared to 2019, where there were around 2 million dengue cases (WHO, 2021). While in Indonesia dengue data for the last 4 years was obtained, in 2019 there were 129,889 cases with 996 deaths, in 2020 there were 99,609 cases with 524 deaths, in 2021 there were 10,480 cases with 62 deaths, in 2022 there were 68,032 cases with 415 deaths, and in 2023 there were 29,347 cases with 249 deaths. Although the number of dengue cases has decreased, it is still a serious health problem in Indonesia. Several provinces in Indonesia that are dengue endemic areas include East Java, Central Java, DKI Jakarta, Bali and South Sulawesi. (Indonesian Ministry of Health, 2020).

The West Java Health Office recorded that West Java dengue data as of December 22, 2022, was 36,608 cases with 305 deaths. The cities with the highest cases are Bandung City with 5,205 cases, Bandung Regency with 4,191 cases, Bekasi City with 2,442 cases, and Depok City with 2,234 cases (West Java Health Office, 2022). Meanwhile, according to the Head of P2P of the Sumedang Health Office, dengue cases in Sumedang Regency in 2022 have increased compared to 2021. Based on data from the Sumedang Health Office, the number of dengue cases in 2022 from January to September totaled 1468 cases with 14 deaths. Of the 14 dengue deaths this year spread across several districts, namely Jatinangor, Tanjungsari, South Sumedang, North Sumedang, Cimalaka, Cisarua and Jatinunggal (Sumedang Health Office, 2022).

In the profile of the Cimalaka Health Center, dengue data for the last 4 years was obtained, in 2019 there were 140 people, in 2020 there were 68 people, in 2021 there were 122 people, and in 2022 there were 128 people with 1 death. This shows that dengue disease that occurs in the working area of the Cimalaka Health Center has increased in 2022 (Profile of the Cimalaka Health Center, 2022).

According to the results of research by Ni Komang Widyantini, Health Polytechnic of the Ministry of Health, Denpasar, a D4 Environmental Health student, stated that the respondents' water reservoirs in Jimbaran sub-district, South Kuta District, with poor conditions, were 41 respondents and with good conditions as many as 59 respondents. The respondents' waste processing in Jimbaran Village was in poor condition, namely as many as 41 respondents and with good conditions as many as 41 respondents. And the incidence of dengue fever in Jimbaran Village was obtained by 46 respondents who had suffered from dengue fever and as many as 56 respondents had never suffered from dengue. Ni Komang Widyantini stated that there is a significant relationship between water reservoirs and waste treatment with the incidence of Dengue Hemorrhagic Fever in Jimbaran sub-district, South Kuta District.

Based on a preliminary study that I conducted at the Cimalaka health center on March 21, 2023, the results of an interview with one of the health services in the health sector stated that 72.21% of environmental sanitation in Citimun Village was still poor. So that causing dengue disease in the Citimun Village Environment is still a case that must be handled. Citimun Village has 6 RWs and 26 RTs with 2,076 households and a population of 5,637 people with 2,958 men

and 2,697 women. As well as the data I got from the Cimalaka Puskesmas DHF officer, that dengue disease data was obtained in Citimun Village for the last 4 years, in 2019 there were 21 cases, in 2020 there were 17 cases, in 2021 there were 11 cases and in 2022 there were 10 cases.

Based on the above background, researchers are interested in conducting research on the relationship between mosquito breeding sites and waste management with the incidence of dengue hemorrhagic fever (DHF) in Citimun Village, Cimalaka District.

## 2. Materials and Methods

The research method used is quantitative research that is descriptive analytic with a *Cross Sectional approach*. The population in this study is the heads of families of Citimun Village, Cimalaka District, as many as 5. 724 KK. The sampling used in this study was using the *Slovin formula*, with a sample of 100 respondents. The instruments used questionnaires and observations. Data analysis includes univariate analysis and bivariate analysis using *the Chi Square test*.

## 3. Results and Discussion

The following are the results of research on the Relationship between Environmental Sanitation and the Incidence of Dengue Hemorrhagic Fever (DHF) in Citimun Village, Cimalaka District: In 2023, the number of respondents in this study is 100 people (KK). This research was conducted from May 30 to June 9, 2023 in Citimun Village. The data collection method is carried out using questionnaires and observations.

### 3.1 Results

#### 3.1.1 Univariate analysis

##### 1) Mosquito Breeding Place

Table 1		
Mosquito Breeding Place		
Category	Frequency	Percentage (%)
None	46	46.0
Exist	54	54.0
Total	100	100

Source : Primary Data 2023

Based on table 1, it can be said that the majority of people in Citimun Village have mosquito breeding sites and the most frequency is in the existing category, which is 54 families (54.0%)

2) Waste Management

**Table 2**  
**Waste Management**

Category	Frequency	Percentage (%)
Not Doing	30	30.0
Do	70	70.0
Total	100	100

Source : Primary Data 2023

Based on Table 4.2, it can be concluded that people in Citimun Village who carry out waste management are 70 households (70.%) while those who do not carry out waste management are 30 families (30.0%).

3) Incidence of Dengue Hemorrhagic Fever

**Table 3**  
**Incidence of Dengue Hemorrhagic Fever**

Category	Frequency	Percentage (%)
Not	80	80.0
Exist	20	20.0
Total	100	100

Source : Primary Data 2023

Based on table 4.3, it can be concluded that the people of Citimun Village who have been affected by dengue disease are 20 people (20.0%) while those who have never been affected by dengue fever are 80 people (80.0%).

### 3.1.2 Bivariate Analysis

#### 1) The Relationship Between Mosquito Breeding Sites and the Incidence of Dengue Hemorrhagic Fever (DHF)

**Table 4**  
**The Relationship Between Mosquito Breeding Sites and Dengue Hemorrhagic Fever (DHF) Incidence in Citimun Village, Cimalaka District in 2023**

Mosquito Breeding Place	Incidence of Dengue Hemorrhagic Fever (DHF)						P Value
	Exist		Not		Total		
	F	%	F	%	F	%	
None	30	30.0	16	16.0	46	46.0	0.001
Exist	50	50.0	4	4.0	54	54.0	
Total	80	80.0	20	20.0	100	100.0	

Based on table 4, the significance results are  $0.001 < 0.05$ , so there is a significant relationship between mosquito breeding sites and dengue incidence in Citimun Village, Cimalaka District.

#### 2) The Relationship of Waste Management with the Incidence of Dengue Hemorrhagic Fever (DHF)

**Table 5**  
**The Relationship between Waste Management and the Incidence of Dengue Hemorrhagic Fever (DHF) in Citimun Village, Cimalaka District in 2023**

Place	Incidence of Dengue Hemorrhagic Fever (DHF)						P Value
Waste Management	Exist		Not		Total		
	F	%	F	%	F	%	
Not Doing	19	19.0	11	11.0	30	30.0	
Do	61	61.0	9	9.0	70	70.0	0.008
Total	80	80.0	20	20.0	100	100.0	

Based on table 4.5, the results of  $0.008 < 0.05$  signikansi, there is a significant relationship between waste management and dengue incidence in Citimun Village, Cimalaka District

### 3.2 Discussion

#### 1) Overview of Mosquito Breeding Places

The picture shown in this study is that the majority of people who have mosquito breeding sites with the most frequency are in the existing category, which is as many as 76 families (76.0%), while for those who do not have mosquito breeding sites with no category, there are 24 families (24.0%).

This research is in line with the research of Anggun Tri Madona (2022), which states that the majority of 100 people have mosquito breeding sites with 52 people (52.0%) in the category. However, it is not in line with Widiyanti's research (2022), which states that out of 100 people, the majority do not have mosquito breeding sites with no category as many as 56 people (56.0%).

This is because people leave their used goods around the house, so that when it rains used goods such as cans, drinking bottles can be flooded and become rainwater reservoirs, so these items trigger mosquito breeding sites.

#### 2) Overview of Waste Management

The picture shown in this study is that the majority of people who carry out waste management are as many as 52 households (52.0%), while for those who do not do waste management are as many as 48 families (48.0%).

This research is in line with the research of Anggun Tri Madona (2022), which states that the majority of 100 people do not carry out waste management as many as 46 people (46.0%). However, it is not in line with Widiyanti's research (2022), which states that out of 100 people, the majority carry out waste management, there are 59 people (59.0%).

This is because the community has not implemented the separation of organic and inorganic waste, and does not dispose of waste every two days and garbage bins that are not watertight.

#### 3) Relationship between Mosquito Breeding Site and Dengue Incidence

The results of this study with a significance value of  $0.000 > 0.001$ , there is a significant relationship between mosquito breeding sites and dengue incidence in the Citimun Village Area. This shows that the two variables have a negative relationship, meaning that the higher the mosquito breeding site, the lower the incidence of DHF and vice versa. Because the result is a significant relationship then ( $H_0$  is rejected), the two variables have a fairly close degree of coaeration.

Based on the theory, it is explained that the main breeding sites of *Aedes Aegypti* mosquitoes are water reservoirs in the form of puddles that are accommodated somewhere around the house or public places, usually exceeding a distance of 500

meters from the house. These mosquitoes cannot thrive in standing water that is directly related to the ground.

This study is in line with that conducted by (Anggun Tri Madona, 2022) which shows that there is a relationship between mosquito breeding sites and the incidence of dengue hemorrhagic fever ( $P = 0.008$ ). However, it is not in line with what was done by Ni Komang (2022) which showed that there was no relationship between mosquito breeding sites and the incidence of dengue hemorrhagic fever ( $P = 0.0281$ ).

From the observations, there are still many respondents who leave their used items around the house, so that when it rains used goods such as cans, drinking bottles can be flooded and become rainwater reservoirs, so that these items trigger mosquito breeding sites.

#### 4) Relationship between Waste Management and Dengue Incidence

The results of this study with a significant value of  $0.000 > 0.008$ , then there is a significant relationship between waste management and the incidence of dengue fever in the Citimun Village Area. This shows that the two variables have a negative relationship, meaning that the higher the waste management, the lower the incidence of dengue fever and vice versa. Because the results have a significant relationship,  $H_0$  is rejected.

Based on the theory, it is explained that waste is the rest of human daily activities and natural processes in solid form. Specific waste management is a systematic, comprehensive and continuous activity that includes reduction and handling. The waste processing site with the 3R principle ( *Reduce, Reuse, Recycle*) hereinafter abbreviated as TPS 3R is a place to carry out collection, sorting, reuse and recycling activities on an area scale (Government Regulation, 2020).

This research is in line with what was conducted (Widiyantini, 2022) which showed that there is a relationship between waste management and the incidence of dengue hemorrhagic fever ( $P = 0.000$ ). However, it is not in line with what is done (Anggun Tri Madona, 2022) which shows that there is no relationship between waste management and the incidence of dengue hemorrhagic fever ( $P = 0.091$ ).

With a significant relationship between waste management and the incidence of dengue hemorrhagic fever in the Citimun Village Area, efforts that can be made are advised to the community to carry out waste management ranging from sorting organic and inorganic waste, disposing of waste at least twice, completing trash cans with lids and by maximizing the government's role in transporting waste, providing health promotion to the community about Problems caused by waste so that it can affect the clean and healthy behavior of the community and the creation of good environmental sanitation.

#### **4 Conclusion**

1. The majority of people in Citimun Village where there are mosquito breeding sites and the most frequency is in the existing category, which is 54 families (54.0 %).
2. People in Citimun Village who carry out waste management as many as 70 households (70.0%) while those who do not carry out waste management as many as 30 families (30.0 %).
3. Citimun Village people who have been exposed to dengue disease as many as 20 people (20.0%) while those who have never been exposed to dengue fever as many as 80 people (80.0%).
4. There is a relationship between mosquito breeding sites and the incidence of dengue hemorrhagic fever in Citimun village. This is obtained from the results of obtaining a significance value of 0.001.
5. There is a relationship between waste management and the incidence of dengue hemorrhagic fever in Citimun village. This is obtained from the results of obtaining the results of this study with a significant value of 0.008.

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#### **Conflict of Interest**

All Authors declare no conflict of interest and agree with the content of the manuscript.

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