

ENVIRONMENTAL AND SOCIAL RISK FACTORS IN THE EVENT OF DENGUE HEMORRHAGIC FEVER (DHF) IN THE WORK AREA OF JIWAN HEALTH CENTER, MADIUN REGENCY

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Article Info

Article history:

Received August 8, 2022

Revised August 8, 2022

Accepted January 01, 2023

Keywords:

DHF

Environmental

Social Risk Factors

ABSTRACT

Environmental and Social Risk Factors in the Event of Dengue Hemorrhagic Fever (DHF) in the Work Area of Jiwan Health Center, Madiun Regency. In the past three years, the Jiwan Health Centre's area has had the highest dengue fever incidence in Madiun Regency. This area still has many water puddles that serve as mosquito breeding grounds. The Jiwan Health Center reported 40 cases and 2 deaths in 2019, 6 cases in 2020, and 16 cases in 2021. This study aimed to identify environmental and social risk factors linked to dengue fever cases in this region. We used an analytical observation method, including a case-control study, and analyzed data with the chi-square test, using probability sampling. A study that looked at just one variable found that air temperature (36.3%), humidity (83.3%), house index (68.8%), container index (41.3%), the lack of mosquito larvae observer cadres (87.5%), fogging activity (55%), and DHF PSN activity (27.5%) were all dangerous. Bivariate test results showed a correlation between the container index ($p = 0.000$) and fogging activities ($p = 0.042$) with DHF incidence. There was no significant connection between dengue incidence, air temperature ($p = 0.642$), humidity ($p = 1.000$), house index ($p = 0.335$), jumantic cadre activities ($p = 0.737$), or PSN DHF activities ($p = 0.453$). Environmental and social factors, such as positive larvae presence and fogging activities, contribute to the dengue fever incidence in the Jiwan Health Center's area. For the past three years, this area has consistently had the highest dengue fever cases in Madiun Regency, primarily due to persistent mosquito breeding sites.

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INTRODUCTION

Based on data from the Indonesian Ministry of Health shows that the incidence of dengue fever in Indonesia tends to remain high every year. The incidence rate (IR) of dengue fever in 2017 was 26.1 per 100,000 population. Meanwhile, in 2018 there was a decrease, namely 24.8 per 100,000 population. In 2019 there was a spike, reaching 51.5 per 100,000 population and in 2020 there was a decline, namely 40 per 100,000 population. The number of dengue fever cases reported in Indonesia in 2020 was 108,303 cases. Deaths due to dengue cases in 2020 were 747 deaths.

Madiun Regency is an endemic area for dengue fever because every year there are always dengue cases. Based on data obtained from the Madiun District Health Service in 2018 there were 124 cases with 1 death, resulting in a CFR of 0.8%. Meanwhile, in 2019 there was an increase in cases of 289 and 4 deaths, resulting in a CFR of 1.3%. In 2020 there were 86 cases and 2 deaths, resulting in a CFR of 2.3%. Meanwhile, in 2021 until September there were 58 cases and 1 death. Thus, Madiun Regency is an area that experiences high mortality due to dengue fever because the CFR is $> 1\%$. The larvae-free rate in Madiun Regency has reached 83% but this is still below the target of $\geq 95\%$. An ABJ value of $\geq 95\%$ is a benchmark for the success of the dengue fever control program in Indonesia, this is done as an effort to limit the transmission of dengue fever.

The highest cases of dengue fever in Madiun Regency are in the working areas of the Jiwan Health Center, Summersari Health Center and Wungu Health Center. There were 2 cases of dengue fever at the Jiwan Community Health Center in 2018. Meanwhile, in 2019 there were 40 cases with 2 deaths. In 2020 there were 6 cases and in 2021 there were 16 cases of dengue fever. In the Summersari Community Health Center working area, in 2018 there were 6 cases, in 2019 there were 21 cases, and in 2020 there were 8 cases. Meanwhile, in the Wungu Community Health Center working area, in 2018 there were 2 cases, in 2019 there were 19 cases, and in 2020 there were 2 cases. Based on this, the Jiwan Community Health Center is the highest community health center with dengue fever cases in the Madiun Regency area.

Controlling dengue fever cannot be carried out by the community alone because the participation of all related parties is needed so that it can achieve success in controlling dengue fever. DHF is also influenced by the level of prevention carried out by the community and local government in reducing the transmission and spread of DHF.⁽¹⁾ The research results show that the failure of the dengue fever prevention and eradication program in carrying out prevention and efforts to reduce the incidence of dengue fever is closely related to the lack of participation by community members in planning and implementing program activities.⁽²⁾ Based on the preliminary survey conducted, it is known that up to now there are several main activities of the dengue control program that have not been running well, including controlling dengue vectors and community participation in efforts to eradicate dengue fever. Apart from that, although the Madiun Regency government has issued various circulars in the form of instructions, appeals and health promotions related to dengue fever, to date the activities to eradicate mosquito nests (PSN) have not been carried out according to expectations. This is proven by the Madiun Regency Larvae Free Rate which is still below the provisions set by WHO.

Apart from that, in residents' neighborhoods there are still many used cans and gutters where the water does not flow properly, so this can result in mosquito breeding. Based on the facts above, this research must be carried out so that the dengue fever problem can be resolved. Apart from that, based on initial observation surveys, environmental factors and social factors are suspected to have a strong impact on the increase in dengue cases. So, researchers want to analyze environmental factors and social factors regarding the incidence of Dengue Hemorrhagic Fever at the Jiwan Community Health Center, Madiun Regency

MATERIALS AND RESEARCH METHODS

Quantitative research using observational analytical methods and Case Control analytical design. This research was carried out with the scope of all villages in the working area of the Jiwan Health Center from March 2022 to April 2022. The case population in this study was all dengue fever sufferers recorded at the Jiwan Health Center from 2019-2021, namely 62 cases, while the control population was all residents who were not registered as dengue sufferers from 2019-2021. Apart from that, the selection of controls was based on house characteristics that were almost the same as the case group but different RTs from the case group and had a house distance of at least 100 meters. The sampling technique uses *probability sampling*. So we got a case sample of 40 houses and a control sample of 40 houses. The dependent variable in this research is the incidence of Dengue Hemorrhagic Fever in the Jiwan Community Health

Center working area. The independent variables in this research are air temperature, air humidity, House Index (HI), Container Index (CI), jumantik cadre activities, fogging activities, and PSN DHF activities. Primary data was obtained from observations at the respondent's home, while secondary data was obtained from the Madiun District Health Service and Jiwan Community Health Center.

At the data coding stage, each environmental and social factor variable that is at risk is coded number 1 and those that are not at risk are coded number 2. The data analysis technique used is univariate analysis to obtain the characteristics of each variable in the study. Meanwhile, bivariate analysis was carried out to analyze the relationship between the 2 variables to be tested with the statistical test used in this research, namely the chi-square test based on the degree of confidence (CL = 95%) with α set at 0.05 ($\alpha = 5\%$).

RESULTS OF RESEARCH AND DISCUSSION

The following is a statistical overview of air temperature, air humidity, house index, container index, jumantik cadre activities, fogging activities, and dengue PSN activities in the Jiwan Health Center work area for 2019-2021.

Table 1. Results of Environmental and Social Quality Analysis

Research variable	Results Criteria	Results
Air temperature	Risky (25°C - 30°C) No Risk (<25°C or >30°C)	36.3% 63.7%
Humidity	Risk $\geq 70\%$ No Risk < 70%	83.3% 16.3%
House Index	Risk $\geq 5\%$ No Risk < 5%	68.8% 31.3%
ContainerIndex	Risk $\geq 5\%$ No Risk < 5%	41.3% 58.8%
Jumantik Cadre Activities	There isn't any There is	87.5% 12.5%
Fogging Activities	There isn't any There is	55% 45%
PSN DBD activities	There isn't any There is	27.5% 72.5%

Table 2. Results of analysis of the relationship between environmental and social quality and the incidence of dengue fever

Variable	Dengue fever incidence				p-value	OR (95% CI)	Information
	Case		Control				
	N	%	N	%			
Air temperature						1,385	No connection
Risky (25°C - 30°C)	16	40	13	32.5	0.642	(0.554-3.458)	
No Risk (<25°C or >30°C)	24	60	27	67.5			
Humidity						0.832	No connection
Risk ≥ 70%	34	85	33	82.5	1,000	(0.253-2.737)	
No Risk < 70%	6	15	7	17.5			
House Index						1,800	No connection
Risk ≥ 5%	30	75	25	62.5	0.335	(0.689-4.702)	
No Risk < 5%	10	25	15	37.5			
ContainerIndex						16,333	There's a relationship
Risk ≥ 5%	25	70	5	12.5	0,000	(5,143-51,872)	
No Risk < 5%	12	30	35	87.5			
Jumantik Cadre Activities						0.630	No connection
Risky (none)	36	90	34	85	0.737	(0.163-2.427)	
No risk (any)	4	10	6	15			
Fogging Activities						2,810	There's a relationship
Risky (none)	17	42.5	27	67.5	0.042	(1,129-6,991)	
No risk (any)	23	57.5	13	32.5			
PSN DBD activities						1,658	No connection
Risky (none)	9	22.5	13	32.5	0.453	(0.614-4.482)	
No risk (any)	31	77.5	27	67.5			

From the results of the univariate analysis depicted in table 1, what appears to be quite large is the risk of air humidity with a frequency of 85% and the absence of jumantik cadre activity with a frequency of 90%. Meanwhile, the smaller difference is PSN DBD activities which are at risk with a frequency of 22.5%. Meanwhile, based on the bivariate analysis table of 7 independent variables, only 2 variables have a significant relationship, namely container index p-value 0.000 with OR 16.333 (5.143-51.872) and fogging activity p-value 0.042 with OR 2.810 (1.129-6.991).

When this research was carried out in February-March, this was the transition season from the rainy season to the dry season. This causes the air temperature to increase, but sometimes it is still accompanied by high rainfall.

Relationship between air temperature and dengue fever incidence

Statistical test results for air temperature at risk (25°C- 30°C) was 36.3% while those who were not at risk (<25°C or >30°C) of 63.7%. The average air temperature obtained for Jiwan District based on field measurement results is 31°C. The highest average air temperature is in Sambirejo Village, namely 34.2°C and air temperature the lowest was in Metesih Village at 29°C.

Air temperature does not have a significant relationship with the incidence of dengue fever, because the p-value is 0.642 ($p \leq 0.05$). However, with an Odds Ratio value of 1.385 and 95%CI = 0.554 - 3.458, it is indicated that respondents with a risky air temperature have a 1.385 times greater chance of contracting dengue fever compared to respondents whose air temperature is not at risk. Because the OR value is >1 and 95% CI = 0.554 - 3.458, air temperature is not a risk factor for dengue fever. Based on research that has been carried out, the air temperature is around 29°C- 34.2°C. Whereas air temperature $\geq 30^\circ\text{C}$ not included in the optimum temperature for mosquito breeding. So, this can cause there is no relationship between air temperature and the incidence of dengue fever. Apart from that, air temperature is not related to the incidence of dengue fever because there are other factors that can influence it directly, such as human behavior and larval index.

In research conducted by Devita (2020) in Bandar Lampung City with a p value of 0.041, it shows that there is a relationship between temperature and dengue cases. From this research, the air temperature results were around 27.8°C- 28.8°C and the air temperature is included in the optimum temperature category for mosquito breeding.⁽³⁾

To minimize the air temperature in the case of dengue fever, it is necessary to ensure that the house building has an air temperature that is not optimal for the development of mosquitoes, such as by opening the windows so that sunlight can enter so that it can warm the room. Apart from that, it can be done by installing cross ventilation, namely 2 vents installed facing each other so that air circulation is expected to be smooth.

Relationship between air humidity and dengue fever incidence

Air humidity that is at risk ($\geq 70\%$) is 83.3% and that is not at risk (<70%) is 16.3%. The average humidity obtained based on field measurement results is 75.5%, with a range between 71% - 78%. The highest average air humidity is 78% in Jiwan Village and the lowest is 71% in Sambirejo.

Air humidity does not have a significant relationship with the incidence of dengue fever because the p value is 1,000 ($p \leq 0.05$). Air humidity in this study was not related to dengue fever cases, because the results of air humidity measurements in the case group and control group did not show significant differences. Apart from that, descriptively the average air humidity is in the range of 71% -78%. This air humidity is the lower limit of optimum humidity for vector breeding, so there is no relationship between air humidity and dengue cases that occur.

Research conducted by Putri (2019) in Pekanbaru City stated that there was no significant relationship between air humidity and dengue cases (p value = 0.41). The air humidity from

the research results ranges from 78.3% -79.8%, which is still classified as the lower limit of optimum air humidity for mosquito breeding. ⁽⁴⁾ Air humidity does not directly affect dengue cases, but it can affect the survival of mosquitoes. The absence of a relationship between humidity and dengue fever cases could be due to other influencing factors such as a person's behavior and the larval index in each residence.

Even though air humidity cannot directly influence the incidence of dengue fever, efforts need to be made to minimize it by improving air circulation because humid air has the potential to breed mosquitoes. Every resident's house must have ventilation installed in every room and are required to open the windows every day. Apart from that, you can install screen covers on the windows so that mosquitoes from outside cannot enter. If possible, use an air curtain (blower placed above the door) to prevent mosquitoes and insects from entering.

Relationship between House Index and DHF Incidence

Observation results show that many water reservoirs have become breeding places for both case and control samples. Containers where mosquito larvae are found are mostly found in bathtubs, buckets and piles of used goods. These places are controllable containers, where the three types of containers are containers that are used every day. Bathtubs and buckets are containers where many larvae are found in various places. Many larvae are found in bathtubs because they are in places with poor lighting and high humidity, so they have the potential to become a breeding ground for mosquito larvae. Apart from that, people also do not regularly drain it, so it can become a breeding ground for mosquitoes which could potentially pose a risk of dengue fever.

House Index those at risk ($\geq 5\%$) were 68.8% while those not at risk ($<5\%$) were 31.3%. House Index has no relationship with the incidence of dengue fever because it has a p-value = 0.335 ($p \leq 0.05$). However, based on the calculation of the Odds Ratio of 1.800 with 95% CI = 0.689 – 4.702, it shows that respondents with a house index that is classified as at risk with an HI value of $\geq 5\%$ have an 1,800 times risk of becoming a sufferer of dengue fever in Jiwan District. Because the OR value is >1 and 95%CI = 0.689 – 4.702, the house index is not a risk factor for dengue cases. This condition is because the house index at risk in case and control houses tends to have a slight difference, namely 5 houses. The number of case houses with index houses at risk is 30 houses, while the control houses are 25 houses, so that there is no significant difference in the distribution of index houses at risk between case and control houses.

Hilmawan Suryanto (2018) who conducted research in Probolinggo stated that there was a relationship between the House Index and the incidence of dengue fever with a p value of 0.044.⁽⁵⁾ The house index variable has a significant relationship because a case house that is positive for larvae and has many water reservoirs that are positive for larvae will increase the risk of contracting dengue fever. HI better describes the extent of mosquito distribution in an area. However, this parameter is considered weak in terms of the risk of disease transmission because it does not count TPA. So, to support the HI number, the CI number can also be measured.⁽⁶⁾

House index risks can be minimized by replacing permanent water reservoirs with buckets or showers. This replacement aims to reduce mosquito breeding sites because if you use a bucket, it can be drained after use. If routine draining cannot be done, it can be avoided by closing the water reservoir.

Relationship between Container Index and DHF Incidence

Based on the results of field observations, there are still many people who use permanent bathtubs as water reservoirs, either made from cement or ceramic. Only a small number of people use buckets as water reservoirs in bathrooms or showers. Apart from that, mosquito larvae were also found in buckets, piles of used goods, used tires, plant pots, pet water

containers, and puddles of water around the house. This occurs due to a lack of checks by the homeowner to bury or replace these tools. From observations of non-landfill containers, we found many types of piles of used goods that were positive for larvae, such as used bottles and cans. Many people store used goods which are classified as solid waste to be collected and later sold to waste collectors to make money. Apart from that, these used items are also used as places for pets to eat or drink. Others also use used food cans as pots for planting ornamental plants.

Test results for container indexes that were at risk ($\geq 5\%$) were 41.3% while those that were not at risk ($< 5\%$) were 58.8%. The resulting p-value is 0.000 ($p \leq 0.05$) so that there is a significant relationship between the index container and the incidence of dengue fever. Apart from that, based on risk calculations, an Odds Ratio value was obtained of 16.333 with 95%CI = 5.143 - 51.872, which means that respondents with a risk index container had a chance of contracting dengue fever of 16.333 or 16 times greater when compared to respondents with a non-risk index container. Because the OR value is > 1 and 95%CI = 5.143 - 51.872, the container index is a risk factor for dengue fever cases in Jiwan District. This is because there are still many discoveries in the field, containers containing mosquito larvae. The presence of mosquito larvae can be at risk of increasing the incidence of dengue fever. These larva-positive containers are often found in bathtubs, bird drinking places, puddles of water around the house, as well as used items that are left open for water cisterns.

Steps that can be taken to ensure that the container index value is not at risk ($< 5\%$) include that the public is expected to care more about the surrounding environment. Places that have the potential for mosquito breeding must be given more attention by doing 3M (draining bathtubs, covering water reservoirs, and burying used items) plus (Plus) other methods such as regularly changing the water in flower vases and bird drinking places, repairing water channels. damaged so that there is no stagnant water, using abates in water reservoirs, using mosquito nets when sleeping, using wire mesh in air vents, avoiding the habit of hanging clothes, keeping tinhead fish, maintaining mosquito repellent plants, and using medicine that can prevent mosquito bites.

Relationship between Jumantik Cadre Activities and DHF Incidents

Based on observations made in the field, it was found that the role of jumantik cadres was lacking in reducing the incidence of dengue fever. According to the midwife's statement, the role of jumantik cadres has been assigned to each family, so each family must monitor the presence of larvae in their homes independently. From this information it can be said that the distribution of jumantik cadres is still irregular. If the jumantik cadres are not active, the community's water reservoirs or containers are not monitored. So that people who do not care about the importance of monitoring larvae may be at risk of contracting dengue fever because the development cycle of the *Aedes aegypti* mosquito can continue well. Community awareness must be increased. Government efforts to increase public awareness of the importance of eradicating mosquito nets have been carried out frequently. However, low public awareness causes failure in efforts to eradicate mosquito nests.

The activities of jumantik cadres who are at risk due to lack of activity are 87.5%, while those who are not at risk are 12.5%. The chi square test between the activities of jumantik cadres and the incidence of dengue fever in this study produced a p-value = 0.737 ($p \leq 0.05$) so that H_0 was accepted. Thus, there is no significant relationship between the activities of jumantik cadres and the incidence of dengue fever. The Odds Ratio value is 0.630 with 95% CI = 0.163 - 2.427 indicating that respondents who do not have jumantik activity have a 0.630 times risk of becoming a sufferer of dengue fever. Because the OR value is < 1 and 95% CI = 0.163 - 2.427, the activity of jumantik cadres is not a risk factor for dengue fever cases. This is because the role of jumantik cadres in reducing dengue cases has not been maximized so that water reservoir checks cannot be carried out routinely, which has resulted in the potential for mosquito breeding. Apart from that, the number of Jumantik cadres is only small, namely 1

cadre who checks 3 RTs. The number of cadres is small because their job is only to monitor the implementation of larvae inspections which are carried out independently by the community. However, the community itself also does not have the awareness to carry out these checks.

This research is in line with research conducted by Purwono, et al (2019) which states that there is no significant relationship between jumantik cadres and the incidence of dengue fever with a p value of 0.105. In this research, it was stated that the presence of jumantik cadres was relatively small.

Cadre activities can be increased through increasing predisposing, enabling and reinforcing factors. However, in order to provide access or encouragement to reduce the incidence of dengue fever, jumantik cadre activities must be expanded and integrated with PSN dengue fever activities. Apart from that, the community must have the awareness to carry out dengue fever PSN activities at least in the home and surrounding environment so that cadres and the community can work together to reduce the potential for dengue fever incidents.

Relationship between fogging activities and dengue fever incidence

Fogging activities that are risky due to the absence of fogging activities are 55%, while those that are not at risk are 45%. Meanwhile, the results of the chi square test showed that the p-value for the fogging activity variable was 0.042 ($p \leq 0.05$) so that H_0 was rejected. Thus, there is a significant relationship between fogging activities and the incidence of dengue fever. Apart from that, based on risk calculations, the Odds Ratio value was obtained at 2.810 with 95%CI = 1.129 - 6.991, which means that respondents who did not have fogging activities had a chance of contracting dengue fever of 2.810 or 3 times greater when compared to respondents who had fogging activities. Because the OR value > 1 and 95%CI = 1.129 - 6.991, fogging activities are a risk factor for dengue fever cases in Jiwan District. This is because fogging at the Jiwan Community Health Center is only carried out if the number of sufferers in the RT is at least 2 and the houses are close together, so that not all dengue cases are fogged. This is done to avoid mosquito resistance to chemicals, causing the mosquitoes to become increasingly resistant. Kasumbogo said that there are several variables that influence the level of mosquito resistance to an insecticide. These variables include insecticide concentration, spraying frequency, and spraying area.⁽⁷⁾

Based on observations in the field, fogging activities were carried out by special officers from the Madiun Regency Health Office. Fogging is carried out in the morning around 07.00 to 10.00 and in the afternoon from 15.00 to 17.00. If done during the day, mosquitoes are no longer active, and the fogging fumes easily evaporate because the air is too hot. Apart from that, fogging activities are also not carried out when it rains because it will be in vain. Fogging is carried out in the patient's house, the home environment, and houses around the patient's house within a radius of 100 – 400 meters. This fogging is not able to eradicate mosquito larvae but only kills adult mosquitoes. Fogging uses 4% malathion insecticide mixed with diesel.

This research is not in line with research conducted by Purwono, et al (2019) which states that there is no significant relationship between fogging activities and the incidence of dengue fever with a p value of 1,000. This means that the fogging activities that have been carried out so far have not had an impact on reducing the incidence of dengue fever. This happens because fogging efforts do not immediately break the chain of transmission because only adult mosquitoes are eradicated, while *Aedes aegypti* mosquito larvae are still alive and growing.⁽⁸⁾

Fogging activities can run smoothly if they are carried out according to procedures and carried out by officers who understand the procedures for carrying them out. Apart from that, carrying out fogging must pay attention to temperature, humidity, wind speed, and the dosage used must be in accordance with WHO standards, so that fogging activities can run optimally and can eradicate the presence of the *Aedes aegypti* mosquito.

Relationship between PSN DBD Activities and DHF Incidents

DBD PSN activities that are at risk due to the absence of DHF PSN activities are 27.5%, while those that are not at risk are 75%. Meanwhile, the results of the chi square test showed that the p-value for the PSN DBD activity variable was 0.453 ($p \leq 0.05$), thus accepting H_0 . Thus, there is no significant relationship between DBD PSN activities and the incidence of DHF. The Odds Ratio value is 1.658 with 95%CI = 0.614 - 4.482, meaning that respondents with no dengue PSN activities have a 1.658 times risk of becoming sufferers of dengue fever compared to respondents who have dengue PSN activities. Because the OR value is >1 and 95%CI = 0.614 - 4.482, the PSN of DHF is not a risk factor for the incidence of DHF.

Based on observations made in the field, there are already several people who have the awareness to carry out PSN independently, at least in their own homes and the surrounding environment. However, there are still many people who are reluctant to use PSN. In this case, it is made worse by the absence of cadres in the community who check or remind them, so that the community relies on awareness of behavior to carry out DHF PSN. Some PSN steps that are often encountered in the field are using mosquito repellent when sleeping, using mosquito nets, and keeping fish. Meanwhile, there is still very little awareness among the community itself to get rid of the existence of used goods. Sprinkling abate powder is rarely done because people think it causes an unpleasant odor when bathing. 3M activities carried out in the community only drain bathtubs. Meanwhile, closing the bathtub reservoir is still rarely done and burying used items is never done by the community. Because people prefer to collect used goods to resell to waste collectors.

The results of this research are in accordance with the results of research conducted by Purwono, et al (2019) which stated that there was no significant relationship between DBD PSN activities and the incidence of DHF with a p value of 0.712. In this case, it means that PSN-DBD activities do not help reduce the incidence of dengue fever significantly. The PSN-DHF movement must be increased further to boost efforts to reduce the incidence of dengue fever, for example by adding the 3 M Plus movement.

CONCLUSIONS AND RECOMMENDATIONS

In 2019 there were 40 dengue fever cases with 2 deaths, in 2020 there were 6 cases, and in 2021 there were 16 cases. Most sufferers are female and in the age group 10-14 years. Based on the relationship between environmental factors and the incidence of Dengue Hemorrhagic Fever (DHF), it is known that there is no significant relationship between air temperature, air humidity and house index and the incidence of DHF. However, there is a significant relationship between container index and the incidence of dengue fever. Meanwhile, the relationship between social factors and the incidence of Dengue Hemorrhagic Fever (DHF) is known to have no significant relationship between the activities of jumantik cadres and PSN DBD activities and the incidence of dengue fever. However, there is a significant relationship between fogging activities and the incidence of dengue fever.

It is hoped that the Health Service and Community Health Centers can carry out fogging by paying attention to temperature, humidity, wind speed, and the dose used must comply with WHO standards. To reduce dengue cases, jumantik cadre activities must be expanded and integrated with PSN-DBD and 3M Plus activities. It is hoped that people will care more about the environment in which they live and protect the environment to avoid dengue fever. Apart from that, the community can play an active role independently in improving Mosquito Nest Eradication (PSN) behavior with 3M Plus.

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