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Analysis of Factors Influencing The Incidence of Dangue Hemorrhagic Fever (DBD) In Semarang City

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Abstract

Dengue Hemorrhagic Fever is an infectious disease caused by acute viral infection, namely the dengue virus. Symptoms include fever for 2-7 days, accompanied by signs of bleeding, a decrease in the number of platelets (thrombocytopenia), and plasma leakage characterized by hemoconcentration. The aim of this study is to analyze the factors that most influence the incidence of dengue fever in the city of Semarang. This research uses a case control research design. The case population is all dengue sufferers, while the control population is people who are declared negative for dengue fever through microscopic examination of blood smears. The sample consisted of 2 groups, namely 45 respondents in the case group and 45 respondents in the control group, accompanied by the use of purposive random sampling techniques. The instrument uses a questionnaire sheet. Data analysis used the Chi Square test and Logistic Regression test. The results of the research show that there is a correlation between water storage, level of knowledge, efforts to eradicate mosquito nesting areas, use of anti-mosquito medication and behavior of hanging clothes with dengue cases (p-value < 0.05). Factors that influence the incidence of dengue fever are water storage, level of knowledge, and efforts to eradicate mosquito nests. It is necessary to carry out preventive efforts independently for each family member.

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INTRODUCTION

Dengue fever (DHF) is a dangerous condition that can cause death and become an endemic disease in Indonesia more than 100 countries in developing and developed countries, including Africa, America, the Eastern Mediterranean region, Southeast Asia and the Western Pacific, along with countries such as France, Croatia and a number of other countries in Europe, so that they require appropriate and appropriate handling strategies. integrated (Ahmed et al., 2021; Monintja et al., 2021).

WHO reported that Indonesia has the highest dengue fever cases in Southeast Asia (Hasan et al., 2016; Kularatne & Dalugama, 2022; Sharma et al., 2021). In Indonesia, cases of dengue hemorrhagic fever continue to occur every year. In 2016, dengue fever spread to 463 regencies/cities with a morbidity rate reaching 78.13 per 100,000 population. There is a very increasing development of the disease and the spread of dengue fever cases. This can occur due to erratic population movements and high mobility, especially during development urban area.

The morbidity rate or Incidence Rate (IR) of dengue fever in 2017, especially in Central Java province, reached 21.68 per 100,000 population, a decrease from the previous year, namely 43.4/100,000 inhabitants in 2016. This shows that the IR rate of dengue fever in Central Java is below the national target (<51/100,000 population) and the Strategic Plan target (<48/100,000 population).

The city of Semarang is an endemic city for dengue fever, where there are cases of dengue fever every year with an even distribution of dengue fever in 16 sub-districts and 177 sub-districts. Based on data from the Semarang City Health Service, there were 320 cases of dengue fever in Semarang City in the last 3 years with a CFR value of 1.25%. Based on research on environmental factors with the existence of water storage containers, residential density, height, air humidity, temperature, ventilation. This is in line with research carried out by Wijirahayu S (2019) that environmental factors such as ventilation, humidity, lighting, the presence of containers have an influence on incidence of Dengue Hemorrhagic Fever (Wijirahayu & Sukesi, 2019). According to (Yunita, 2012) environmental factors have quite a big influence. Potential locations for the Aedes agypti mosquito to breed are containers, such as drums, bathtubs, toilets, buckets, etc. Based on the results of a preliminary study conducted through observations in Delta Pawan sub-district, it appears that there are still many open water storage containers such as jars/barrels, drums, etc., as well as places that are not water storage containers such as animal drinking places, used goods, flower vases, etc. Which are still widely found, apart from that, many residents' houses also lack ventilation and lighting.

According to (Fitriana & Yudhastuti, 2018) The increase in dengue fever cases is caused by the continued abundance of several mosquito breeding places such as barrels, bathtubs, buckets, water storage containers that are not used for daily needs such as used tires, bird drinkers, flower vases, trash cans and natural water storage containers such as fronds, taro leaves, tree holes, stone holes and so on (Binsasi et al., 2021; Pereira & Schimit, 2022; Prasad et al., 2022).

Containers as a breeding place for Ae. Aegypti is able to increase the population of Ae. Aegypti, which in turn increases the risk of dengue virus transmission. Soedarto explained that the density level of Aedes spp larvae can be observed from entomological parameters such as the House Index (HI), Container Index (CI), and Breteau Index (BI), which can illustrate the level of dengue transmission. The increasing density of mosquitoes means that the risk of dengue virus infection also increases. The aim of this research is to analyze the factors that most influence the incidence of dengue fever in Semarang City. It is hoped that the results of this research can be input for related agencies, especially the Semarang City Health Service and the responsible health technical implementation units, namely all Community Health Centers down to the sub-district level. It is hoped that the information presented from this research can be a reference in determining policies and intervention priorities in improving public health, especially in reducing dengue fever rates.

METHOD

This research is survey research accompanied by the use of a case control design, researchers will carry out analytical analysis. This research procedure begins with taking care of the research permit and continues with collecting data from respondents. The population to be studied includes two groups, namely the case population and the control population. The case population is dengue fever sufferers recorded in January 2023 - December 2023 in Semarang City. Meanwhile, the control population is individuals who do not show clinical symptoms and according to the results of microscopic examination of their blood smears, they are negative for dengue fever. The sample consisted of 2 groups. A total of 45 respondents from the intervention group and 45 respondents from the control group were selected using the purposive sampling method. The inclusion criteria were living in the community health center area where the research was conducted and one or more family members suffering from dengue fever, being recorded as having suffered from dengue fever from January to December 20 23, and being available to be a respondent until the research was completed. The exclusion criteria are those who suffer from other diseases, for example typoid fever, chikungunya, fever due to flu and others. The distribution of sample proportions in each health center was using proportionated random sampling. Data analysis used the Chi Square test and test Regression Logistics. Data processing uses the SPSS application.

RESULTS AND DISCUSSIONS

The results of research that has been carried out regarding various factors that influence the incidence of dengue hemorrhagic fever (DBD) in the city of Semarang include: on Table 1.

Table 1. Frequency distribution of factors that influence the incidence of dengue hemorrhagic fever (DHF) in the city of Semarang

Factors in the incidence of dengue hemorrhagic fever (DHF)	N	%
Gender		
Man	41	45.6
Woman	49	54.4
Education		
High (high school, PT)	72	80.0
Low (Elementary, Middle School)	18	20.0
Age		
Old (age productive/ 15-50 years old)	29	32.2
Adult (age No productive or > 50 years old)	61	67.8
Eradicating Mosquito Nests		
Not enough	50	55.6
Good	40	44.4
Existence of water storage containers		
Not enough	50	55.6
Good	40	44.4
Use of mosquito repellent		
Yes	46	51.1
No	44	48.9
Nap Habits		
No	61	67.8
Yes	29	32.2
Clothes hanging behavior		
No	45	50.0
Yes	45	50.0
Residential Density		
Not enough	30	33.3
Good	60	66.7
Occurrence of Dengue Hemorrhagic		
Fever	45	50.0
Yes		
No	45	50.0
Total	90	100

Table 1 shows that the average respondent is female (54.4%). These findings indicate that the greater number of female respondents affected by dengue fever in this research was not caused by their gender, but was more influenced by other variables such as age, physical environmental conditions, and access to health-services. These results are in accordance with research by Devi (2015) which explains that gender influences the risk of dengue fever with or without shock, and genetic factors related to gender and hormonal factors have an influence on the death rate due to dengue fever. Glycoprotein hormones influence the differentiation of mononuclear phagocyte cells and granulocyte cells as the body's response to infection. Gender differences must be considered in terms of disease incidence, because they arise

due to different anatomy, physiology and hormonal systems (Hikmah & Kasmini H, 2015).

The research results show that the majority of respondents have a high category of education (SHS & University), namely 80%, while the other 20% of respondents have a low category of education (Elementry & JHS). According to Sunarsih & Azam (2017), sociodemographic factors such as education level are related to the incidence of dengue fever. Research by Sandra et al. (2019) also shows that the risk of dengue fever in mothers with low education is two and a half times higher than in mothers with higher education.

This research found that the majority of respondents were aged 15-50 years (adults), namely 67.8%. One of the characteristics of a person that plays an important role in the development of this disease is age. This role is crucial because age can provide a description of various factors that cause disease, but can also be used to observe differences in disease frequency. This finding is consistent with previous research by Sari (2005), which showed that age group influences disease transmission. The presence of more individuals aged less than 15 years increases the possibility of developing dengue fever.

The results of research that has been carried out show that 565.6% of respondents in Semarang City have water storage containers, and the remaining 44.4% of respondents do not have water storage containers. Sucipto et al.'s research. (2015) Indicates that respondents who have water storage containers containing larvae have an 8.8x higher risk of experiencing dengue fever infection compared to respondents who have water storage containers without larvae. In line with research by Octaviani et al. (2021) in their research found that open/closed water storage containers were correlated with the incidence of dengue fever and respondents who lived in houses with open water storage containers had a 2.7-fold higher risk of experiencing dengue infection than respondents who lived in houses with closed water storage containers. Kusuma (2018) found that there was a correlation between the number of open or closed water storage places and the incidence of dengue fever, showing that respondents who had water storage places, both closed and open, had a 2.723 times higher risk of experiencing dengue fever.

The findings in this research are that the majority of respondents have good residential density, namely 66.7%. The remaining 33.3% were respondents who had poor housing density. This finding was obtained after considering the size of the house and the number of residents in it. In accordance with Law Number. 1 in 2011 concerning Housing and Settlement Areas, a residence is considered dense if the residential density is less than 9m 2 per person. Therefore, the level of residential density is not related to the incidence of dengue fever (Ma et al., 2022; Tomia et al., 2019).

However, the results of this research contradict the findings reported by Sofia in 2014, where it was found that there was no correlation between residential density in the house and the incidence of dengue fever, with a p value = 0.202 and OR = 1.9 (95 CI = 0.8 - 4.5). Hermansyah also found that there was no correlation between residential density and the incidence of dengue fever. This shows that population density itself is not a direct cause of DHF, but can act as a risk factor when combined with several other factors such as environmental sanitation, level of knowledge, population mobility, attitudes and actions regarding dengue fever, the existence of breeding locations for Aedes mosquitoes in general. Overall which can increase the risk of dengue fever (Hermansyah, 2012).

This research revealed that some of the

respondents had adequate insight, while half had inadequate knowledge. These findings show that many people in Semarang City already know the correct information regarding dengue fever. Knowledge has a big influence on the existence of mosquito habitat in the area. With good knowledge, behavior will be good, and then the environment will be better. So, this shows that with adequate knowledge about dengue fever, you can reduce the risk of dengue fever (Boulaaras et al., 2022; Lestari et al., 2021; Mok et al., 2021; Yunita et al., 2012).

The results of this research show that mosquito nest eradication activities are in the deficient category, namely 55.6%. The eradication of the Aedes aegypti mosquito is

carried out to reduce cases of dengue fever because this mosquito is a vector that transports the dengue virus. Apart from that, there are various effective and suitable methods for controlling mosquito populations (Ministry of Health, 2014).

The results of interviews with respondents show that many of them are just clean the water storage area by simply watering it without using soap. Besides there it is also those who do not sort waste and many still sleep in the afternoon. Many houses also do not use abate powder in their water reservoirs every 2 months, giving 1 gram of abate per 10 l of water, this is due to the lack of availability of abate powder and the uneven distribution of it to each house.

Using anti-mosquito medication is a strategy to prevent dengue fever. Apart from that, there are several other preventive measures that can be implemented, for example using larvicides, vaccine development and fogging. In Indonesia, the use of anti-mosquito medication has the greatest impact and contribution in preventing dengue fever compared to hogging or larval control methods (Yunis, Wahyono, & Mw, 2016).

The research results show that the majority of respondents use mosquito repellent, amounting to 51.1%. The remaining 48.9% of respondents did not use mosquito repellent. According to research conducted by Novrita et al (2017), it was found that respondents who were in the habit of using mosquito repellent were 1.632x more likely to suffer from dengue fever than respondents who were not in the habit of using mosquito repellent. Likewise, Sinaga & Hartono (2019) explained that those who do not use anti-mosquito medication are twice as likely to suffer from dengue fever as those who use anti-mosquito medication.

Findings research show that the majority

of respondents, as many as 67.8%, do not have the habit of napping. The remaining 32.2% have this habit. This factor is related to the behavior of the Aedes Aegypti mosquito which actively bites in the morning and evening when people tend to take a nap. Therefore, family members who often take naps, especially without using mosquito nets or anti-mosquito lotion, are at risk of being bitten by the Aedes aegypty mosquito. However, respondents who do not usually take naps still have the potential to be bitten by mosquitoes if their house is infested with Aedes aegypty, or when they are working outside the home. The habit of napping can accelerate the spread of dengue hemorrhagic fever because female mosquitoes look for their prey during the day. Mosquito biting activity generally occurs from morning to evening, with peak activity between 08.00 – 12.00 and 15.00 – 17.00 (Suharmiati, 2007).

The research results show that 50% of respondents are accustomed to hanging clothes and 47.8% of respondents do not have the habit of hanging clothes, the results show the same in the 2 groups of cases and controls. According to Mahardika (2009), his research found that a correlation was found between hanging up used clothes and the incidence of dengue fever. Aedes mosquitoes tend to prefer to live in dark and damp places, including hanging clothes. This plant's discrepancy with previous research may be triggered by several additional factors, such as the use of mosquito repellent which can reduce mosquito populations even when clothes are hung up.

This is strengthened by research by Anton (2008) where a similar correlation was found between clothes hanging behavior and the incidence of dengue fever, where 32.7% of respondents had good habits and 67.3% had bad habits. However, different results were found by Ririn et al (2013) in their research where no significant correlation was found between clothes hanging behavior and the incidence of dengue fever (p=0.388), and the calculated odds ratio (OR) value was 0.507 with a 95% Confidence Interval (CI) amounting to 0.157-1.635. From these results, it was concluded that the behavior of hanging used clothes is not a risk factor in the incidence of dengue fever.

Chi-square test analysis results in table 2. found that the factors of water storage containers, knowledge, eradication of mosquito nests, use of anti-mosquito medication, and clothes hanging behavior were significantly related to the incidence of dengue hemorrhagic fever (DHF).

There is no correlation between gender and the incidence of dengue fever because both men and women are at similar risk of contracting

Table 2. Chi Square Test Analysis of the Relationship between Gender, Education, Age, Water Storage Containers, Residential Density, Knowledge, Eradicating Mosquito Nests, Drug Use, Nap Habits, Clothes Hanging Behavior

Factor	Exclusive Breastfeeding		*P-Value*	OR
	Dengue Fever	Not Dengue Fever		
Gender				
Man	20 (48.8%)	21 (51.2 %)	1.000	-
Woman	25 (51.0 %)	24 (49.0 %)		
Education				
Tall	37 (51.4%)	35 (48.6%)	0.792	-
Low	8 (44.4%)	10 (55.6%)		
Age				
15-50 Years (Adult)	28 (45.9 %)	33 (54.1 %)	0.347	-
>50 Years (Old)	17 (58.6 %)	12 (41.4 %)		
Water storage container				
There is	31 (62.0 %)	19 (25.0 %)	0.020	3.030
No	14 (35.9 %)	26 (64.1 %)		
Residential Density				
Not enough	19 (63.3 %)	11 (36.7%)	0.118	-
Good	26 (43.3%)	34 (56.7%)		
Knowledge				
Not enough	31 (68.9%)	14 (31.1%)	0.001	4.903
Good	14 (31.1%)	31 (68.9%)		
Eradicating Mosquito Nests				
Not enough	31 (62.0%)	19 (38.0%)	0.020	3.030
Good	14 (35.0%)	26 (65.0%)		
Use of mosquito repellent				
No	28 (63.6%)	16 (36.4%)	0.020	2.985
Yes	17 (37.0%)	23 (63.0%)		
Nap Habits				
No	28 (45.9%)	33 (54.1%)	0.367	-
Yes	17 (58.6%)	12 (41.4%)		
Clothes hanging behavior				
Yes	28 (62.2%)	17 (37.8%)	0.035	2.713
No	17 (37.8%)	28 (62.2%)		

the disease. Both men and women generally have similar activities at home, such as when they are not working. Even though there are family members who work, their workplace environment tends to be similar to home, such as offices for employees or laborers, and schools for civil servants (teachers). The Aedes mosquito as a dengue vector does not subjectively choose to bite a particular gender. Therefore, both women and men are at equal risk of being bitten by the Aedes aegypti mosquito. According to the research results, it was found that 51% of respondents were female and included in the case group (DHF sufferers). In addition, according to the Chi-square test analysi, the results showed that gender was not correlated with the incidence of dengue fever (p value = 1,000).

According to the research results, it was found that 51.4% of respondents were highly educated and included in the case group (DHF sufferers). In addition, according to the Chi-square test analysis, the results showed that age had no correlation with the incidence of dengue fever (p value = 0.792). This research is in line with research conducted by Rezki & Zaira (2016). It was found that 55 respondents showed good preventive measures with higher education, while 23 respondents with higher education showed poor preventive measures. A total of 8 respondents with low education showed good preventive measures, and 14 respondents with low education showed a lack of preventive measures. Bivariate analysis showed a p value = 0.003, with 95% Confidence Interval (CI) = 1.546

-11.327, and odds ratio (OR) = 4.18.

Age is a factor that influences susceptibility to dengue virus infection. All age groups can be attacked by the dengue virus, even if it is only a matter of days after birth (Wati, 2009). The characteristics of each person indirectly create differences in conditions and reactions to exposure to pathology. The differences can be seen in different age groups. It was found that 45.9% of respondents aged 15-50 years were included in the case group (DHF sufferers). In addition, according to the Chi-square test analysis, it was found that age was not correlated with the incidence of dengue fever (p value = 0.347). The findings from this research are consistent with previous research conducted by Sari, which showed that age group has an influence on disease transmission. A larger number in the age group under 15 years indicates a higher risk of developing dengue fever (Wijirahayu & Sukesi, 2019; Sari, 2005).

Research results show that dengue hemorrhagic fever tends to occur in patients whose homes have water storage containers, 31 people (60.8%), compared to patients whose homes do not have water storage containers. In addition, according to the Chi-square test analysis, the results showed that there was a correlation between the incidence of dengue fever and water storage containers (p value = 0.033). According to the views of several respondents, bathtubs located inside the house tend to be large in size and have a large surface area, making it difficult to replace them. In addition, bathtubs are often located in rooms that are not exposed to sunlight and are damp, which can cause the presence of mosquito larvae. Previous research also indicated that Aedes aegypti mosquitoes tend to like water containers in the house that are dark, open and not exposed to sunlight, so the possibility of finding Aedes aegypti larvae in respondents' bathtubs is greater (Nadifah et al, 2016).

Overcrowding in the house also contributes to the experience of dengue fever. Mosquitoes that inhabit a house tend to be susceptible to biting individuals who are exposed to viral infections, and then bite other individuals who inhabit the same house. This is caused by the nature of mosquitoes which can bite humans alternately over a short period of time, which is known as multiple biters (Ariati & Hananto, 2011).

Research findings show that there is no correlation between residential density and the incidence of dengue hemorrhagic fever (DHF) in the Semarang City Health Center and Health Service area in 2023. However, the large population in an area can facilitate the spread of dengue fever, because this can cause the virus to spread. dengue is transmitted quickly through vectors (Sumampouw, 2017; Sumampouw, 2018). This finding is supported by research by Toan (2014) which shows that the number of residents and the size of the house do not have a significant correlation with the incidence of Dengue Hemorrhagic Fever in Hanoi, Vietnam (p value > 0.05).

Lack of understanding of basic matters regarding dengue fever can potentially influence community prevention efforts because knowledge or understanding is a key factor in shaping individual behavior (Notoatmodjo, 2011). Therefore, if socialization is carried out evenly among the community, then the possibility of preventive measures being implemented by them can increase. According to the research results, it was found that 68.9% of respondents who had insufficient knowledge about dengue fever were included in the case group (DHF sufferers). In addition, according to the Chi-square test analysis, the results showed that knowledge was correlated with the incidence of dengue fever (p value = 0.001).

Research findings show a correlation between the level of knowledge and the incidence of dengue fever. If someone has adequate health knowledge, they will try to distance themselves or minimize risk factors for disease, and they may even adopt supportive behavior to improve their personal health (Notoatmodjo, 2011). However, sometimes even though someone has knowledge about dengue fever, they do not always apply it in proper preventive measures.

According to the research results, it was found that 62% of respondents had poor behavior in eradicating mosquito nests and were included in the case group (DHF sufferers). In addition, according to the Chi-square test analysis, the results showed that mosquito nest eradication

activities had a significant correlation with the incidence of dengue fever (p value = 0.020).

Controlling dengue fever through PSN can only be done through active community participation, which is only possible through increasing awareness and changing behavior. The success of a number of countries in dealing with dengue fever has been achieved through the transformation of community behavior consistent with the COMBI method (Yushananta, 2006). By holding regular monthly meetings to plan dengue fever prevention activities, there can be a significant reduction in the House Index, and Container Index, Breteau Index numbers (Therawiwat et al, 2005).

Research findings show a correlation between the use of mosquito repellent and the incidence of dengue fever. Mosquitoes have the ability to detect prey through recognizing the smell of carbon dioxide, lactic acid or other aromas produced by moist and warm skin. Anti-mosquito oil or lotion usually functions as a change to the aroma emitted by the skin.

The use of anti-mosquito oil or lotion is necessary, especially during the day when mosquitoes are active. The dengue virus which triggers dengue fever enters the human body through the bite of the Aedes aegypti mosquito. The virus then reproduces in the mosquito's saliva and then the mosquito can spread the virus throughout its life. If female Aedes aegypti mosquitoes bite individuals who are suffering from viremia, they can transmit the virus through their bites to other people. This mosquito has a tendency to suck human blood (anthropophilic) and often sucks blood more than once in one period of its feeding cycle, increasing the risk of dengue fever transmission.

People who have the habit of napping are at risk of increasing the spread of dengue fever because female mosquitoes tend to prey during the day. This prey activity usually starts from morning to evening, accompanied by 2 peaks of activity which occur between 08.00 to 12.00 and 15.00 to 17.00 (Suharmiati & Handayani, 2007). According to the research results, it was found that 56% of respondents had the habit of napping and were included in the case group (DHF sufferers). In addition, according to the Chi-square test analysis, the results showed that the habit of napping was not correlated with the incidence of dengue fever (p value = 0.367).

Research findings show that there is no correlation between napping behavior and the incidence of dengue fever. This is because the habit of sleeping in the morning/afternoon cannot be done because most respondents work. Biting activity usually starts in the morning until Usually, mosquitoes start biting from morning to evening with two peaks of activity occurring between 09.00 to 10.00 and 16.00 to 17.00. Aedes has the behavior of sucking blood more than once in one feeding cycle to fill its stomach with blood. Thus, this mosquito is very effective as a vector for transmitting dengue fever pathology (MOH RI, 2015).

According to Dermala (2012), hanging used clothes in the room is an environment favored by mosquitoes and is a risk factor for experiencing dengue fever pathology. Dark and damp areas are favorite locations for mosquitoes to land and wait for their eggs to mature, and hanging used clothes is a way for mosquitoes to lay their eggs because light and air humidity influence flying activity and the placement of mosquito eggs. People's habit of hanging clothes in their rooms is due to the practicality of using clothes the next day, as well as because of the lack of storage space in their homes or because they are reluctant to store used clothes in the cupboard to avoid unpleasant odors that might spread to clean clothes.

Research findings show that there is a correlation between clothes hanging behavior and the incidence of dengue hemorrhagic fever (DHF). These results were strengthened by the finding that in the respondent's room, there were lots of clothes hanging behind the bedroom door, on the cupboard door, and even on the wall. Besides there it is Also clothes scattered on the bed. These places are often the choice of mosquitoes to stop for a while. Therefore, to prevent clothes from becoming a resting place for mosquitoes, it is recommended that clothes that have been used be placed in the dirty clothes storage area, while clothes that have not been used are folded neatly and stored in the cupboard. This is because the Aedes aegypti mosquito tends to like places such as clothes hanging in rooms to rest after sucking human

Table 3. Multivariate Logistic Regression with the Most Influence on the Incidence of Dengue Hemorrhagic Fever (DHF) in Semarang City

	Coefficient	S.E	Wald	df	*p- value*	OR	CI 95%	
							Min	Max
Water storage container	1.161	0 .542	4.595	1	0 .032	3.193	1.105	9.230
Knowledge	1.935	0 .540	12.850	1	<0.001	6.924	2.404	19.946
PSN	1.033	0.510	4.102	1	0 .043	2.809	1.034	7.631
Constant	-2.667	0.652	16.752	1	<0.001	0.069		

blood (Central Java Health Office, 2014).

Table 3 Multivariate analysis carried out by applying the logistic regression method. The variables that had been identified through bivariate analysis, such as water storage containers, level of knowledge, eradication of mosquito nests (PSN), use of mosquito repellent, and clothes hanging behavior, were then tested to see their effect on the incidence of dengue hemorrhagic fever (DHF).

Findings found that the existence of water storage containers, lack of knowledge, and lack of behavior in eradicating mosquito nests, were factors that influenced the incidence of dengue fever in Semarang City. The presence of a water storage container has an effect on the incidence of dengue fever and is 3,193 times more likely to experience dengue fever than the absence of a water storage container.

The results of this research are relevant to research conducted by Azizah and Faizah (2010), it was stated that houses that have more than three water storage containers have a higher risk of contracting dengue fever. This is caused by the possibility of breeding Aedes sp larvae. which is high due to the large number of water storage containers. The same findings were also found in research conducted by Lagu (2017) in Balleangin Village.

Other research indicates that the presence of containers has a significant role in the density of Ae larvae. aegypti. The large number of containers means that the locations available for breeding are increasing, so that the Aedes mosquito population can become denser. The dense population of Aedes mosquitoes increases the risk of being infected with the dengue virus, which then triggers a more rapid spread of the disease and an increase in the number of dengue cases. As a result, the possibility of disease outbreaks increases (Rahmadani BY, 2017; Situation A, 2008).

Knowledge has a big influence on the existence of mosquito habitat in the area. With good knowledge, behavior will be good, and then the environment will be better. So, it can be concluded that with good knowledge about dengue fever, you can reduce the risk of dengue fever. Lack of knowledge has a significant impact on the incidence of dengue fever, with a risk 6.924 times higher than good knowledge. This finding is in line with other research which also shows a correlation between knowledge and the incidence of dengue fever (Wati et al., 2015) and (Purnama et al., 2013).

Insufficient activities to eradicate mosquito nests are one of the factors influencing the incidence of dengue fever in Semarang City. This research shows that a lack of effectiveness in eradicating mosquito nests has a 2,809 times greater impact on the incidence of dengue fever than well- implemented measures to eradicate mosquito nests. This finding is consistent with the research results of Felta (2021) which shows that less effective practices for eradicating mosquito nests are associated with an increased risk of dengue fever, accompanied by a p-value of 0.019 and a risk of 1.07 times getting dengue fever.

CONCLUSION

Conclusion in this study is related factors with the incidence of dengue fever is place water storage, knowledge, eradication nest mosquitoes, density occupancy, ventilation, use drug mosquitoes, habit hang clothes, and habit use mosquito net with incidence of dengue fever (p-value < 0.05), whereas factor influential risks to the incidence of dengue fever is place water storage, knowledge, and activity eradication nest

mosquito.

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