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RELATIONSHIP BETWEEN COMMUNITY BEHAVIOR AND DENGUE HEMORRHAGIC FEVER INCIDENCE

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ABSTRACT

According to DHF incidence data obtained from the Madiun City Health Profile, there were 48 cases and one death in 2021, an increase in cases of 212 cases with one death in 2022, and there were still 144 cases with one death in 2023. The purpose of this study is to determine the relationship between community behavior and the incidence of dengue hemorrhagic fever in the Manguharjo Health Center Working Area, Madiun City. This study has used quantitative research with a case-control research design. The study population was all dengue hemorrhagic fever patients recorded in medical records in Winongo and Nambangan Lor Villages with a period of January 2023-16 February 2024, totaling 29 cases. The sample used was 54 respondents, with 27 cases and 27 controls. The sampling technique used was purposive sampling, with the inclusion criteria of the case being that the patient had suffered from DHF disease, while the exclusion criteria were that the patient moved residence when the study was conducted. The Data analysis used was a univariate and bivariate analysis using the Chi-Square test. The results show that there is a relationship between the presence of hanging clothes p-value of 0.013 with an odds ratio of 5.091, there is no relationship between the distance from house to house p-value of 0.420 and an odds ratio of 2.841, and there a relationship between the implementation of eradication to prevent dengue fever transmission p-value of 0.029 and an odds ratio of 4.038. The variable with the highest risk for dengue hemorrhagic fever is the presence of hanging clothes. At the same time, the variable that has the most minor risk is the distance between houses. Therefore, it is expected that the Manguharjo Health Center can educate and counsel the community on implementing mosquito's nest eradication to prevent transmission and minimize dengue cases.

Kata Kunci:

Perilaku Masyarakat; Keberadaan Pakaian Menggantung; Jarak Antar Rumah; Pelaksanaan PSN; Demam Berdarah Dengue;

ABSTRAK

Berdasarkan data kejadian DBD yang diperoleh dari Profil Kesehatan Kota Madiun, terdapat 48 kasus dan 1 kematian pada tahun 2021, dan terjadi peningkatan kasus sebanyak 212 kasus dengan 1 kematian pada tahun 2022, dan masih terdapat 144 kasus dengan 1 kematian pada tahun 2023. Tujuan penelitian ini untuk mengetahui hubungan antara perilaku masyarakat dengan kejadian demam berdarah dengue di Wilayah Kerja Puskesmas Manguharjo Kota Madiun. Penelitian ini menggunakan jenis penelitian kuantitatif dengan desain penelitian case control. Populasi penelitian adalah seluruh pasien demam berdarah dengue yang tercatat di rekam medis Kelurahan Winongo dan Kelurahan Nambangan Lor dengan periode Januari 2023-16 Februari 2024 sebanyak 29 kasus. Sampel yang digunakan sebanyak 54 responden dengan 27 kasus dan 27 kontrol. Teknik pengambilan sampel yang digunakan adalah purposive sampling, dengan kriteria inklusi kasus adalah pasien pernah menderita penyakit DBD sedangkan kriteria eksklusi adalah pasien pindah tempat tinggal saat penelitian dilakukan. Analisis data yang digunakan adalah analisis univariat dan bivariat dengan menggunakan uji Chi Square. Hasil penelitian menunjukkan terdapat hubungan antara keberadaan pakaian yang menggantung p-value sebesar 0,013 dengan odds ratio sebesar 5,091, tidak terdapat hubungan antara jarak antar rumah p-value sebesar 0,420 dengan odds ratio sebesar 2,841, dan terdapat hubungan antara pelaksanaan pemberantasan sarang nyamuk dengan kejadian penularan DBD p-value sebesar 0,029 dengan odds ratio sebesar 4,038. Variabel yang memiliki risiko paling tinggi terhadap kejadian demam berdarah dengue adalah keberadaan pakaian yang menggantung. Sedangkan variabel yang memiliki risiko terkecil adalah jarak antar rumah. Oleh karena itu, diharapkan Puskesmas Manguharjo dapat melakukan edukasi dan penyuluhan kepada masyarakat mengenai pelaksanaan pemberantasan sarang nyamuk untuk mencegah penularan dan meminimalisir kasus demam berdarah.

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INTRODUCTION

According to Dengue Hemorrhagic Fever (DHF) incidence data obtained from the Madiun City Health Profile, there were 48 cases and one death in 2021, an increase in cases of 212 cases and one death in 2022, and 144 cases with one death in 2023. The dengue morbidity rate in 2023 was 80.75/per 100,000 population, and the mortality percentage in 2023 was 0.69%. Data for 2024 up to February 16, 2024, 66 cases of DHF have been reported, 1 case of death, a morbidity rate of 36.89/100,000 population, and a mortality rate of 1.52% (Dinkes PPKB Kota Madiun, 2023). Behavior is one of the factors associated with the occurrence of DHF disease, and this behavior concerns the community's knowledge, attitudes, and actions toward the occurrence of DHF disease (Timah, 2021).

Based on data on the incidence of DHF in the Manguharjo Health Center working area, in 2022, there were 27 cases, and in 2023, there were 39 cases of DHF. The Manguharjo Health Center working area has 4 villages as fostered areas. However, there are 2 villages with the highest number of cases and an increase in cases, namely Winongo Village and Nambangan Lor Village. In 2022, there were 9 cases of DHF in Winongo and 6 cases in Nambangan Lor. Then, there was an increase in the number of DHF cases in 2023 in Winongo Village, as many as 13 cases, and in Nambangan Lor Village, as many as 14 cases. Based on data as of February 16, 2024, two cases were found in Winongo urban village. Winongo and Nambangan Lor villages are endemic areas, and dengue fever cases occur yearly (Puskesmas Manguharjo, 2024).

Based on this background, it is important to analyze the factors that cause an increase in DHF incidence. Behavior is the second largest factor after environmental factors that influence the health of individuals, groups, or communities. Behaviour is also a form of response or reaction to a stimulus or stimuli from outside the organism (person), yet giving a response depends on the characteristics or other factors of the person concerned (Nasution, 2019). According to (Timah, 2021), it shows that there is a relationship between community behaviour and the incidence of DHF. Poor environmental health as a cause of DHF is also influenced by poor community behaviour. The behaviour of people who do not care about environmental health affects the increase in the incidence of dengue fever.

The behaviour of the community in hanging clothes is one of the most dominant factors associated with the incidence of DHF disease. Communities that have the habit of hanging clothes provide opportunities for mosquitoes to rest in their homes. This behaviour can lead to dengue hemorrhagic fever in the area (Umpenawany et al., 2020). The presence of clothes hanging in the room will be a favoured place for mosquitoes to rest while waiting for the egg maturation process. Objects hung inside the house, such as clothes, curtains, and walls, are favoured places by Aedes aegypti mosquitoes. This mosquito likes places with minimal light and moisture hidden in the house (Fadrina et al., 2021). Dewi (2018) explained that there is a relationship between the presence of hanging clothes and the incidence of DHF. If the mosquitoes living in the hanging clothes feed on the blood of dengue patients and then move and feed on the blood of healthy people, the mosquitoes can be infected with dengue hemorrhagic fever (Aran et al., 2021).

The second factor is the distance between houses, where the distance affects the spread of mosquitoes from one house to another; the closer the distance between houses will make it easier for mosquitoes to spread to neighboring houses. The Aedes aegypti mosquito has a short flight distance of 100 meters. Therefore, it is domestic. Mosquitoes can easily move from one house to another if houses are close together. This shows the pattern of DHF spread by the vector to the community around the area (Yuliasari et al., 2019). According to Tunggul Satoto (2018), there is a relationship between the distance from house to house and the incidence of DHF. Houses with nearer distances tend to have more DHF cases. Approximately 72.5% of the households surveyed were very near each other, and the closer distance from house to house showed a relationship with the incidence of dengue fever. The materials used to make the house, the construction of the house, the colour of the walls and the arrangement of items in the house cause the house to be favoured or disfavored by mosquitoes. Various infectious

disease studies have shown that overcrowded and shabby housing conditions are more likely to cause disease (Anggraini et al., 2021).

The third factor is the implementation of 3M Plus. PSN 3M Plus behaviour is a healthy living behaviour that aims to control mosquito breeding sites and efforts to avoid contact with Aedes, which is a vector of DHF (Priesley et al., 2018). 3M action is the most appropriate way because it can prevent and control dengue outbreaks by draining water reservoirs, closing clean water reservoirs, and burying the remains of used goods. The pluses include sprinkling larvicide, using lotion or mosquito repellent, using mosquito nets when sleeping, and installing wire mesh on the ventilation at home. This is one of the effective efforts to avoid becoming a vector nest so that it can reduce the rate of dengue transmission. According to Zulfikar (2019), there is an influence between the implementation of DHF Mosquito Nest Eradication and the incidence of DHF. Increasing the community's knowledge about the PSN 3M Plus can encourage self-motivation to behave positively to reduce the incidence of DHF (Kurniawati et al., 2020). The counselling that is followed will affect changes in community behaviour in implementing Mosquito Nest Eradication. The Madiun City government has appealed to the community in the implementation of 3M Plus mosquito nest eradication. However, the incidence of DHF is relatively high, and there is a spike in cases during the rainy season (Dinkes PPKB Kota Madiun, 2023).

Based on these problems, the researchers are interested in researching the relationship between community behaviour and dengue hemorrhagic fever incidence.

METHOD

Type of Research

This study has used a case-control research design with a survey method, namely distributing questionnaires directly and interviewing participants.

Place and Time of Research

This research was conducted from February to July 2024. Data was collected in May-June 2024 in the Manguharjo Health Center Work Area, Madiun City.

Population and Sample

The population in this study were all DHF patients recorded in medical records in Winongo and Nambangan Lor Villages with a period of January 2023-16 February 2024 (last 1 year) as many as 29 cases. Based on the results of calculations using the Slovin formula, the sample size of this study was 27 respondents for the case group and 27 respondents for the control group, namely families whose members have not/never suffered from dengue fever with a ratio of 1: 1. Thus, the total sample in this study was 54 samples. The inclusion criteria in this study were patients who had suffered from DHF disease, while the exclusion criteria were if the patient moved to another residence when the study was conducted. The control sample in this study matched the case-control study by matching age and gender variables between the case group and the control group to see differences in risk factor exposure for the same respondent characteristics.

Data Collection

The instrument utilized in this study was a questionnaire containing a list of questions posed to respondents regarding data on implementing Mosquito Nest Eradication. The questionnaire comprised 6 items containing mosquito eradication activities with 3M plus. The researchers have tested this questionnaire for validity and reliability. It has been said that the implementation of mosquito nest eradication with favourable criteria if the total score is ≥3 and unfavourable criteria if the total score is <3. To measure the question's validity using the Pearson product-moment correlation formula. The results of the r count are compared with the r table with 5% sig, where the value of the r table = 0.632. Based on the validity test results, the 6 question items are declared valid and can be used as data collection tools in research. All items are also consistently reliable, with a Cronbach Alfa coefficient value 0.929. In addition, the researchers also used observation sheets to determine the presence of hanging clothes and the distance between houses. It has been said that there are hanging clothes if at least one piece of consumable clothing is hanging in the house (not in the cupboard), whether it is a shirt or pants. Meanwhile, the distance between houses is said to be close if the distance between houses is ≤

5 meters. And vice versa, the distance between houses is said to be far if the distance between houses is > 5 meters. The distance between houses has been measured using a meter tool.

Data Analysis and Processing

Data analysis has utilized univariate and bivariate analysis using the Chi-Square test. This test aims to determine whether there is a relationship between community behaviour and the incidence of DHF and measure the magnitude of risk using the Odds Ratio (OR).

RESULT

General data characteristics of respondents can be seen in the following table:

Table 1. Frequency Distribution of Respondents' Characteristics in Manguharjo Health Center Working Area (n=54)

Classification	Respondent		Percent (%)
	Case	Control	
Age			
<5 Years	2	2	7.4
5-11 Years	9	9	33.3
12-25 Years	13	13	48.2
26-44 Years	1	1	3.7
45-59 Years	0	0	0
≥60 Years	2	2	7.4
Gender			
Male	11	11	40.7
Female	16	16	59.3
Education			
Elementary School	5	5	18.5
Junior High School	8	4	22.2
Senior High School	11	13	44.4
College	3	5	14.8
Occupation			
Housewife	12	11	42.6
Merchant	9	12	38.9
Private Employee	2	1	5.6
Civil Servant	1	2	5.6
Not work	3	1	7.4
Total	**27**	**27**	**100**

Source: Primary Data

The table above shows that most respondents are aged 12-25, with 26 respondents (48.2%) in the teenage category. In the gender classification, most respondents are female, with 32 (59.3%) and male, with 22 (40.7%). In addition, most respondents' education is senior high school, with 24 respondents having a percentage of 44.4%. Last, most respondents' occupations are housewives, with 23 respondents having a percentage of 42.6%.

Table 2 shows that out of 27 case respondents, 21 hang clothes (77.8%), and 6 do not hang clothes (22.2%). Meanwhile, out of 27 control respondents, 11 hang clothes (40.7%), and 16 do not hang clothes (59.3%). On variables distance between houses from 27 case respondents, respondents who have a distance between houses <5 meters in the near category are 25 respondents (92.6%), and those who have a distance between houses ≥5 meters in the far category are 2 respondents (7.4%). Meanwhile, out of 27 control respondents, 22 respondents (81.5%) have a distance between houses <5 meters with a near category and 5 respondents (18.5%) have a distance ≥5 meters with a far category.

Table 2. Frequency distribution of respondents based on the Community Behaviour in the Manguharjo Health Center Working Area (n=54)

Variable	DHF Incidence			
	Case		Control	
	n	%	n	%
The Presence of Hanging Clothes				
Yes	21	77.8	11	40.7
No	6	22.2	16	59.3
The Distance Between Houses				
Near	25	92.6	22	18.5
Far	2	7.4	5	81.5
The Implementation of Mosquito Nest Eradication				
Unfavorable	17	63.0	8	29.6
Favourable	10	37.0	19	70.4
Total	27	100	27	100

Source: Primary Data

Regarding the variables of mosquito eradication implementation from 27 case respondents, respondents with mosquito eradication implementation in the unfavourable category are 17 respondents (63%), and those in the favourable category are 10 respondents (37%). Meanwhile, out of 27 control respondents, 8 respondents (29.6%) with the unfavourable implementation of mosquito eradication, and 19 respondents (70.4%) with favourable category.

Table 3. Results of Bivariate Analysis of Community Behaviour with Dengue Hemorrhagic Fever Incidence in Manguharjo Health Center Working Area (n=54)

Variables	The Incidence of DHF				Total		OR (95%CI)	p-value
	Case		Control					
	n	%	n	%	n	%		
The Presence of Hanging Clothes								
Yes	21	77.8	11	40.7	32	59.3	5,091 (1,551-16,709)	0.013
No	6	22.2	16	59.3	22	40.7		
The Distance Between Houses								
Near	25	92.6	22	81.5	47	87.0	2,841 (0,500-16,138)	0.420 (fisher exact test)
Far	2	7.4	5	18.5	7	13.0		
The Implementation of Mosquito Nest Eradication								
Unfavorable	17	63.0	8	29.6	25	46.3	4,038 (1,295-12,585)	0.029
Favorable	10	37.0	19	70.4	29	53.7		
Total	27	100	27	100	54	100		

Source: Primary Data

The study's results are shown in Table 3. The respondents of DHF cases who have the habit of hanging clothes are more, namely 21 respondents (77.8%), compared to DHF control respondents, namely 11 respondents (32.3%). The respondents of DHF cases who do not have hanging clothes are 6 people (22.2%) smaller than the DHF control respondents who do not have hanging clothes, who are 5 people (18.5%).

The study results in Table 3 show that the respondents of DHF cases who have a distance between houses in the near category are 25 respondents (92.6%) compared to the control respondents of DHF, 22 respondents (81.5%). Then, the distance between houses in the far category in DHF cases is 2 respondents (7.4%), smaller than the distance between houses in the far category in control respondents, namely 5 respondents (18.5%).

Table 3 shows that 17 respondents (63.0%) of DHF cases have unfavourable mosquito breeding practices compared to 8 respondents (29.6%) of DHF control respondents. Then, respondents with mosquito nest eradication in the favourable category in DHF cases are 10 respondents (37.0%), smaller

than those with mosquito nest eradication in the favourable category in DHF control respondents, namely 19 respondents (70.4%).

DISCUSSION

Relationship Presence Hanging of Clothes with the Incidence of Dengue Hemorrhagic Fever

Hanging clothes in the house is a behavior that creates a resting place for Aedes Aegypti because this mosquito has a penchant for resting in a place that hangs. So, hanging clothes in the house will be more at risk for dengue transmission (Priesley et al., 2018). Hanging clothes in the room is a favoured resting place for Aedes aegypti mosquitoes after feeding human blood. After resting in time, it will feed human blood again until the mosquito has enough blood to mature its eggs (Aran et al., 2021). Avoiding the habit of hanging clothes in the house is an activity that can be done to control the population of Aedes aegypti mosquitoes so that the transmission of dengue disease can be prevented and reduced. Aedes aegypti mosquitoes usually perch or rest in the house, especially in dark places or hanging clothes. (Apriyani & Yulianus, 2022).

This study's results show a relationship between the presence of hanging clothes. The results of statistical tests using the Chi-Square correction test (Continuity Correction) obtained a p-value of 0.013 ($p < 0.05$), which means that the presence of hanging clothes has a significant relationship with the incidence of dengue hemorrhagic fever in Manguharjo Health Center Working Area. Meanwhile, the results of the Odd Ratio calculation obtained an OR = 5.091 (95% CI = 1.551-16.709), which means that case respondents who have hanging clothes have a 5.091 times greater risk of DHF compared to control respondents who do not have hanging clothes.

According to Budiarti and Fatimah (2023), those who have the habit of hanging used clothes have a 3.9 times greater chance of suffering from dengue hemorrhagic fever compared to those who do not have the habit of hanging used clothes around the house. An unhealthy environment can risk the proliferation and spread of dengue vectors. People's behaviour is still not good towards environmental conditions, such as hanging clothes in the house. Hanging clothes are a favoured place for mosquitoes to land. Aedes aegypti mosquitoes like to rest on hanging clothes in the room to relax after feeding human blood. Handling clothes, a clothing necessity for every human being after use is often ignored. The habit of hanging clothes can lead to an increase in the number of mosquitoes in the house because mosquitoes often prefer to settle on hanging clothes (Yuslita et al., 2023). This study is also in line with research conducted by Apriyani (2022), which found a significant relationship between the presence of hanging clothes and the incidence of DHF. The habit of hanging clothes in the house indicates the pleasure of resting the Aedes aegypti mosquito.

Relationship Distance Between Houses with the Incidence of Dengue Hemorrhagic Fever

The flight distance of the Aedes aegypti mosquito is limited to 50-100 meters, which makes its vector capacity better in environments with dense populations and houses that are near each other. Because the flight distance of mosquitoes reaches 100 meters, mosquitoes easily move at a distance of 5 meters. It is said to have a near distance between houses if it is less than a meter. The closer the distance between houses, the greater the risk of dengue hemorrhagic fever transmission (Tunggul Satoto et al., 2019).

This study's results show no relationship between the distance from house to house and the incidence of DHF. The results of statistical tests using the Chi-Square correction test (Fisher Exact Test) obtain a p-value of 0.420 ($p>0.05$), which means that the distance between houses is not related to the incidence of dengue hemorrhagic fever (DHF) in the Manguharjo Health Center Working Area. The majority of respondents have a distance between houses of less than 5 meters, and some are not even spaced (close together). Respondents who live near houses are usually in residential complex areas. The size of the land also affects where the respondent's house is in a land area that is not large enough, making the distance between his house and the surrounding neighbours quite close.

This study aligns with research conducted by Husna (2020), which shows no significant relationship between the distance between houses and the incidence of DHF in Way Kandis Village, Bandar Lampung, in 2020. Observations during the research show that urban settlements tend to have a distance of less than 5 meters, especially areas with dense populations, which have a near distance between houses. Thus, the results show that most respondents have a distance between houses and neighbours of less than 5 meters. The possibility of not finding a relationship between distance and DHF

incidence in this study is due to the similarity of house distance patterns in the case and control groups where the proportion of poor and good house distance between the two groups was not significantly different (Sulastri et al., 2021).

Relationship Implementing of Mosquito Nest Eradication with the Incidence of Dengue Hemorrhagic Fever

The targets of mosquito nest eradication activities are all potential breeding sites for Aedes mosquitoes, including water reservoirs for daily use. Mosquito nest eradication activities can be conducted through physical, biological, chemical and community empowerment. The community empowerment effort is to implement 3M Plus (draining, closing water reservoirs and recycling goods that are not reused). Implementing Mosquito Nest Eradication activities in the community involves cross-programs and cross-sectors (Indra, 2020). The Implementation of Mosquito Nest Eradication activities that affect the incidence of DHF include, among others, draining water storage containers in the bathroom regularly at least once per week, closing water storage containers, managing objects that are no longer used so that they do not become a place for the development of mosquito nests (Perdaa & Prayoga, 2022).

The results of this study show that there is a relationship between the implementation of mosquito nest eradication and the incidence of DHF. Based on the results of statistical tests using the Chi-Square correction test (Continuity Correction) obtained a p-value = 0.029 ($p < 0.05$), which means that the implementation of mosquito nest eradication has a significant relationship with the incidence of dengue hemorrhagic fever (DHF) in the Manguharjo Health Center Working Area. The Odd Ratio was OR = 4.038 (95% CI = 1.295-12.585), meaning that case respondents with unfavorable mosquito nest eradication practices had a 4.038 times greater risk of suffering from DHF than control respondents with favorable mosquito eradication practices. Based on the observation results, there are 70.4% of control respondents with good mosquito eradication implementation criteria, while 37.04% of case respondents had good criteria. So, more respondents in the control group have practised the implementation of mosquito nest eradication than the case group. The better the Implementation of Mosquito Nest Eradication, the lower the incidence of DHF. Conversely, the worse the Implementation of Mosquito Nest Eradication, the greater the incidence of DHF.

This study is in line with research conducted by Mils and Febrianti (2024), which shows that PSN-DBD behaviour is associated with the incidence of DHF. Mosquito Nest Eradication is one of the activities that is often carried out to eradicate eggs, larvae, and the next form, namely the cocoon of the Aedes aegypti mosquito. Eradication of the Aedes aegypti mosquito is done by eradicating dengue fever cases, as the mosquito vector plays a role in carrying the dengue virus. This Mosquito Nest Eradication activity provides an explanation of the practice of eliminating mosquito nests of dengue vectors and steps to reduce contact or bites of Aedes aegypti mosquitoes. According to Zulfikar (2019), mosquito nest eradication is the most appropriate way to prevent and control the occurrence of DHF outbreaks. Therefore, public awareness of the need to clean the environment, bury the remains of used goods, and close clean water reservoirs is one of the effective efforts in suppressing the rate of transmission of DHF disease. Mosquito Nest Eradication is one of the efforts to control the population of Aedes aegypti mosquitoes so that dengue transmission can be prevented or reduced. To get the expected results, this activity must be carried out widely and continuously (Gladys et al., 2019). If the 3M Plus PSN behaviour is carried out properly, it can break the chain of DHF transmission so that the expected result is that the incidence of DHF can decrease (Priesley et al., 2018).

CONCLUSION AND SUGGESTION

The conclusion of this study is that there is a relationship between the presence of hanging clothes and the implementation of Mosquito Nest Eradication with the incidence of DHF in the Manguharjo Health Center Working Area, indicating a p-value of 0.013, 0.029. It is suggested that the community place dirty clothes in a closed container to prevent them from becoming a mosquito breeding ground and fold clean clothes in the cupboard so that there are no clothes hanging for days. Additionally, it is expected that the Manguharjo Health Center will provide education to the community on implementing mosquito nest eradication to prevent transmission and minimize dengue cases. Future research could explore the effectiveness of different educational interventions in changing community behaviours related to dengue prevention.

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