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ANALYSIS OF THE PHYSICAL HOME ENVIRONMENT AND COMMUNITY BEHAVIOR TOWARDS INCIDENCE OF DENGUE HEMORRHAGIC FEVER IN RIAU PROVINCE

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Abstract

Dengue Hemorrhagic Fever (DHF) is still a health problem in Meranti Islands Regency. There has been an increase of 15-25% of cases every year since 2017-2019. Determine the correlation between the physical home environment and community behavior towards DHF incidence which include: ventilation, air temperature, water reservoirs, knowledge, and attitudes. It was observational analytic with a cross-sectional design. This research was conducted for three months (February-April 2020). The research subject was 94 samples were selected by the purposive sampling technique. The research instrument was a structured questionnaire and observation sheet. Data analysis using Chi-square test. There were 49 (53.3%) cases of DHF with the physical home environment that was not following the health standards, namely: ventilation (bad=70.7%), air temperature (bad=77.2%), water reservoirs (bad=59.8%), knowledge (low=55,4%), and attitude (negative=55.4%). There was a significant correlation between ventilation (p=0,002), air temperature (p=0,020), water reservoirs (p=0,027), knowledge (p=0,008), and attitudes (p=0,000) toward incidence of DHF (p-value <0.05). The physical home environment and community behavior are related to DHF incidence. Good coordination between health promotion team, local government in providing health education and socialization of healthy homes by empowering local communities.

Keywords: Community behavior, Dengue Hemorrhagic Fever, Physical home environment

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Abstract

Background. Dengue Hemorrhagic Fever (DHF) is still a health problem in Meranti Islands Regency. There has been an increase of 15-25% of cases every year since 2017-2019. **Purpose.** Determine the correlation between the physical home environment and community behavior towards DHF incidence including ventilation, air temperature, water reservoirs, knowledge, and attitudes. **Methods.** It was observational analytic with a cross-sectional design. This research was conducted for three months (February-April 2020). The research subject was 94 samples were selected by the purposive sampling technique. The research instrument was a structured questionnaire and observation sheet. Data analysis using Chi-square test. **Results** There were 49 (53.3%) cases of DHF with the physical home environment that was not following the health standards, namely: ventilation (bad=70.7%), air temperature (bad=77.2%), water reservoirs (bad=59.8%), knowledge (low=55,4%), and attitude (negative=55.4%). There was a significant correlation between ventilation (*p*=0,002), air temperature (*p*=0,020), water reservoirs (*p*=0,027), knowledge (*p*=0,008), and attitudes (*p*=0,000) toward incidence of DHF (*p*-value <0.05). **Conclusion.** The physical home environment and community behavior are significant correlations to DHF incidence. Good coordination between health promotion team, local government in providing health education, socialization of healthy homes by empowering local communities.

Keywords: Community behavior, Dengue Hemorrhagic Fever, Physical home environment,

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is an infectious disease caused by the dengue virus and is transmitted through the bite of the Aedes aegypti (Ghina, 2017). Dengue is an acute viral infection with potentially fatal complications. The first clinically recognized epidemics of dengue occurred almost simultaneously in Asia, Africa, and North America in the 1780s. (Gupta, 2012). This DHF disease was first reported in Indonesia in 1968 in Jakarta and Surabaya with 48 sufferers and a mortality rate of 41.3% (Gina, 2017).

Almost all regions in Indonesia suffer from DHF. In Indonesia, the number of dengue cases reported in 2019 was 138,127 cases with an Incident Rate of 51.48 cases per 100,000 population, while the target was < 49 cases per 100,000 population. Riau Province is still at an incidence of 59.9 cases per 100,000 population and is one of the 23 provinces in Indonesia that did not meet the target. Meranti Islands is one of the regencies in Riau province that experiences an increase in dengue cases every year. In 2013 there were 98 cases, in 2014 it was 118 cases and in 2015 it increased to 254 cases (Dinkes, 2019, Ministry of Health 2019)

This disease is related to environmental conditions and people's behavior. Environmental conditions greatly affect the spread of the Aedes aegypti mosquito around us. Risk factors associated with DHF include behavior, temperature, humidity, rainfall, altitude, the presence of water reservoirs, and

mosquito breeding places. DHF is naturally influenced by ecological status with several physical environmental factors. The related physical environment is the type of water reservoir, altitude, rainfall, wind speed, air temperature and humidity, biological environment, and social environment (DIT.JEN. PP & PL, 2007), Prasetyani, 2015

The results of the initial survey conducted in Banglas Village, Meranti Regency, found that the houses looked damp, the garbage was not managed properly, rainwater collections used jars made of cement and were not closed, the ventilation of the house was not good, the lighting in the house was not good, and the environment their house looks very dirty. This condition is caused by the lack of public knowledge about the importance of keeping the environment clean, besides that, the attitude of the people who are less concerned also illustrates that the behavior of the people in the area is still lacking. Based on the initial survey, the researchers wanted to know the relationship between the physical environment of the house and the behavior of the community with the incidence of DHF.

METHOD

It was an observational study with a cross-sectional design. This research was conducted for three months (February-April 2020). The population was 1645 heads of household. 94 respondents participated selected by purposive sampling technique. The research location is in Banglas Village, Meranti Regency, Riau. The dependent variable is the incidence of DHF, the independent variables are the physical environment of the house and the behavior of the community, namely: ventilation, air temperature, water reservoirs, knowledge, and attitudes. For the physical environment of the house, researchers conducted field observations. Ventilation indicator with an eligible category if ventilation >10%. The air temperature with a good category of 25^0C-28^oC. Water reservoirs good category if they are available and closed. As for the variables of knowledge and attitudes using a structured questionnaire that has been tested for validity and reliability. A total of 20 questions using an ordinal scale. Data were analyzed by univariate and bivariate with chi-square test with 95% confidence interval. The Ethics Committee for Health Research, STIKes Hang Tuah Pekanbaru, issued ethical clearance for this study (No. 0209/KEPK/STIKes-HTP/V/2020). Each participant signed written informed consent.

RESULTS

Characteristics of respondents seen from the education level. The majority of low education 57(61.9%), namely Elementary School 20(21.7%) and Junior High School 37(40.2%). Meanwhile, only 35 (37.1%) have higher education, with 33 (35.9%) senior high school and college 2(2.2%). The frequency distribution of univariate analysis between the independent variable and the dependent variable can be seen in Table 1 below.

Tabel 1.
Frequency Distribution of Home Physical Environment, Community Behavior, and DHF Incident

Variable	f (%)
DHF incidence	
Yes	49 (53,3%)
No	43 (46,7%)
Ventilation	
Good >15-25%	27 (29,3%)
Bad ≤ 15-25%	65 (70,7%)
Air Temperature	
Good 25^0C-28^oC	21 (22,8%)
Bad ≤ 25^0C >28^oC	71 (77,2%)
Water reservoirs	
Yes	37 (40,2%)
No	55 (59,8%)
Knowledge	
High	41 (44,6%)
Low	51 (55,4%)
Attitude	
Positive	41 (44,6%)
Negative	51 (55,4%)
Total	92 (100%)

Table 1 showed that there is 53.3% incidence rate of DHF. Bad ventilation 70.7%, bad air temperature 77.2%, water reservoirs that do not meet standards 59.8%, low knowledge, and negative attitude is 55.4%. The results of the bivariate analysis of the significant correlation between the physical home environment, community behavior, and the incidence of dengue fever can be seen in Table 2 below.

Table 2. Statistical results of the physical home environment and community behavior related to DHF incidence

Variable	DHF incidence		*p-value*	POR	95% CI	
	Yes	No			*Lower*	*Upper*
Ventilation						
Bad ≤10 %	42 (64,6 %)	23 (35,4%)	0,002*	5,217	1,920	14,178
Good >10%	7 (25,9 %)	20 (74,1%)				
Air Temperature						
Good 25^0C-28^{o}C	43 (60,6%)	28 (39,4%)	0,020*	3,839	1,331	11,078
Bad ≤ 25^0C >28^{o}C	6 (28,6%)	15 (71,4%)				
Water reservoirs						
Good	35 (63,6%)	20 (36,4%)	0,027*	2,875	1,214	6,808
bad	14 (37,8%)	23 (62,2%)				
Knowledge						
High	15 (36,6%)	26 (63,4%)	0,008*	3,467	1,464	8,208
Low	34 (66,7%)	17 (33,3%)				
Attitude						
Positive	42 (82,3%)	9 (17,6%)	0,000*	22,667	7,649	67,166
Negative	7 (17,1%)	34 (82,9%)				

*Ket : * (signifikan)*

Table 2 reveals that the results of statistical tests show that the five independent factors are related to the incidence of DHF with p-value <0.05. ventilation (p-value 0.002, POR 5.217), air temperature (p-value 0.020, POR 3.839), water reservoirs (p-value 0.027, POR 2.875), knowledge (p-value 0.008. POR 3.467), and attitudes (p-value 0.028, POR 22.667). POR value > 1 means that the head of the family whose physical home environment and behavior are bad/ low/ negative are at risk of developing DHF disease. The negative attitude of respondents is at the highest risk of DHF.

DISCUSSION

Home Physical Environment

In this study, the physical environment of the house is focused on three variables, namely: ventilation, air temperature, and water reservoirs. The results of statistical analysis of these three factors were a significant correlation with the incidence of DHF ($p < 0.05$).

1. Ventilation

Ventilation in this study is the exchange of air in the house with the surrounding environment which serves to supply oxygen in to the room to maintain humidity. In this study, 70.7% of respondents had poor ventilation and were a significant correlation with the incidence of DHF (p-value = 0.002). Sholihah's research (2014) said that ventilation has a significant effect (p-value = 0.026). The study showed that ventilation is eligible if the size is >10% of the floor area. A good measure of ventilation is the most basic DHF prevention effort because it relates to the condition or construction of the house that is occupied daily. Therefore, to avoid the community from DHF, it is necessary to educate the public about the prevention, symptoms, and management of DHF.

2. Air Temperature

Temperature categories that can affect the development of Aedes Egypt are divided into 2, namely good (25ºC-28ºC) and not good (< 25ºC and > 28ºC). Temperature is an important environmental parameter in increasing vector breeding, mosquito gonotrophic cycle, bite rate, shortening the incubation period of pathogens, and prolonging the lifespan of adult mosquitoes. In addition, higher temperatures also increase the rate of larval development (Fitriana and Yudhastuti, 2018). In Banglas Village, the humidity of the house temperature is between 60-75%. The home environment is in a swampy area and the air circulation is not good. There are also puddles in the front and back of the house. Ideally, the humidity should be kept in the range of 45%-64% (RH or Relative Humidity). The average temperature in the Banglas Village area during 2019 - 2020 is 29.2^0 C with a temperature range of 27.6^{0C} - 31.7^0C. This temperature is the optimum temperature for mosquito breeding.

3. Water Reservoir

In Banglas Village, Meranti Islands Regency, residents collect rainwater as a source of needs for drinking and cooking. On average, the residents have rainwater reservoirs in the form of barrels made of cement, large plastic buckets, drums, and plastic tubs. But most of these water reservoirs are not covered and there are mosquito larvae.

There is a relationship between water reservoirs and the incidence of DHF, this study is in line with researchers Mubarokah (2012), Andini (2013) who said that water reservoirs are a risk factor for mosquito breeding and affect the incidence of DHF. In addition, from the results in the field, there are also many houses of residents who do not suffer from DHF but the condition of the water is not closed and the water is left open, this certainly increases the risk of DHF occurrences in these residents. However, they claim to use mosquito repellent which is applied to their skin every morning and night, so that even if their water area is not covered, they are still protected from mosquito bites.

Community Behavior

In this study, people's behavior is focused on two variables, namely: knowledge and attitudes. The results of statistical analysis of these two factors were associated with the incidence of DHF ($p < 0.05$).

1. Knowledge

In this study, the majority of people's knowledge is still low (55.4%). The results of this research are different from the research of Syarif (2013) which states that the knowledge of the community in Maen Village about DHF as a whole gets a score of 72.2% (good category). Another study by Wandasari (2014) said that the higher the knowledge, the better the behavior of preventing DHF ($p<0.05$). The results of this study are in line with Rianasari's research (2016) in Mustikajaya Village, Bekasi City. Knowledge related to the incidence of DHF, the results of the chi-square test obtained p-value = 0.015 ($p\leq0.05$). Sholihah (2014), the test results with multiple logistic regression test stated that knowledge had a significant effect with p-value=0.015 and an exponential value of 0.214 times for suffering from DHF. Health education efforts for the prevention of DHF have not been optimal, public awareness of the environment in which they live is still low.

2. Attitude

In this study, the majority of respondents were still negative (55.4%) and significantly correlated to DHF incidence ($p<0.05$). In line with research conducted by Rahmaditia (2011), Lontoh (2016), and Macpal (2011) that there is a correlation between respondents' attitudes towards dengue prevention ($p<0.05$). The behavior will be sustainable if it is based on awareness and a positive attitude. Attitudes are not

brought from birth, but attitudes can be formed from the respondent's social interactions. There is a reciprocal relationship that influences individuals to influence behavior in interacting with the environment (Notoatmodjo, 2005). It's just that in this study the majority of respondents were negative. There were still respondents who did not keep their home environment clean, they still found clothes hanging in their rooms, did not close the water reservoir tightly. Public awareness and motivation are needed to improve a clean and healthy lifestyle.

Conclusion

The physical home environment (ventilation, air temperature, water reservoirs) and behavior community (knowledge and attitudes) are significantly correlated to the incidence of DHF. The community of Banglas Village, Meranti Regency, Riau is expected to be able to apply a clean and healthy lifestyle in their daily lives, especially in the rainy season. Health workers must coordinate in monitoring the clean and healthy lifestyle of the community sustainably. District health officers can prioritize efforts to prevent and control dengue disease, especially in dengue endemic areas, dominant with people with low education, and areas vulnerable to dengue disease infection

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