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FACTORS RELATED TO DENGUE HEMORRHAGIC FEVER (DHF) IN BONTANG KUALA VILLAGE, BONTANG UTARA DISTRICT

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ABSTRACT

Factors Related to Dengue Hemorrhagic Fever (DHF) in Bontang Kuala Sub- district, North Bontang District. Dengue Hemorrhagic Fever is one of the main public health problems in Indonesia. The number of DHF pain in Bontang Kuala Sub-district has increased over the past 3 years, namely 5 cases in 2019, 19 cases in 2020 and 33 cases in 2021. This study aims to determine several factors related to dengue disease in Bontang Kuala Sub-district, North Bontang District. This type of research used a cross-sectional study design. The population in this study was 1,791 households and a sample of 91 respondents. Samples were taken by the Proportional Random Sampling method. The data analysis technique used a chi-square test with a degree of meaningfulness (p = 0.05). The results of this study showed that 68.1% of respondents had poor used goods management with (p = 0.000), 65.9% had good waste disposal facilities with (p = 0.164), 64.8% had a habit of hanging clothes less well with (p = 0.001) and 72.5% had a habit of using anti- mosquito lotion less well with (p = 0.002). This research advises people to make more frequent efforts to eradicate mosquito nests (PSN) coupled with avoiding the habit of hanging clothes and using mosquito repellent lotions, so that the transmission of DHF disease can be reduced.

INTRODUCTION

Dengue hemorrhagic fever (DHF) is an infectious disease that can and often causes outbreaks that often lead to death. Dengue hemorrhagic fever (DHF) is a disease caused by the dengue virus, which is transmitted through the bite of the Aedes genus mosquito [(1)]. The disease is bleeding and has a tendency to cause shock and death. Dengue fever can appear throughout the year and attack all age groups. This disease is influenced by environmental conditions and people's behavior [(2)].

According to data from the Indonesian Health Profile for 2020, there were 108,303 cases of dengue fever in 34 provinces in Indonesia, and 747 people died. DHF morbidity rate, or incidence rate (IR), will be 40 per 100,000 people in 2020. This number decreased compared to the previous year, namely 138,127 cases of dengue fever, and 919 sufferers died in 2019 [(3)].

According to data from East Kalimantan Province in 2020, there were 2,240 dengue fever cases in East Kalimantan spread across 10 districts and cities. In May 2021, there were currently 442 cases of dengue fever recorded in line with the weather in East Kalimantan. Bontang is one of the cities experiencing an increase in dengue fever cases. Based on data on

dengue fever cases obtained from the Bontang City Health Service, in 2020 there were 269 cases with 2 deaths, and this increased in 2021 for the January-August period to 449 cases with 3 deaths [4].

The working area of the North Bontang I Community Health Center has a high number of dengue fever cases compared to other community health centers; namely, in 2020, there were 125 cases with 1 death, and this increased to 216 cases with 2 deaths in 2021. The population of Bontang Kuala Village is 5,741. The area of Bontang Kuala Village is 6.27 km2. The condition of dengue hemorrhagic fever (DHF) in Bontang Kuala Village has experienced an upward trend over the last 3 years. In 2019, there were 5 cases found; in 2020, there were 19 cases with 1 death; and in 2021, there were 33 cases with 1 death [4].

Dengue fever is influenced by a variety of factors, including the host, agent, and environment. Environmental factors include waste disposal facilities and the management of used goods around the house. Apart from that, if rubbish is piled up haphazardly, it will become a nest for flies and rats. Waste management efforts are closely related to the provision of waste disposal facilities. If the waste disposal facilities are not good, then the management will also be bad [5]. Based on an initial survey conducted in Bontang Kuala Village in September 2021, it appears that the average community's homes have open waste disposal facilities, resulting in standing water in waste disposal sites, which causes mosquito nests to breed. Apart from that, in several locations, there are still environmental conditions that can increase the risk of dengue fever, such as the presence of water reservoirs inside and outside the house. In the environment around residential areas, there are still many things that support mosquito breeding sites, namely the presence of used household items that are no longer used and left alone or thrown around the house, such as bottles, used tires and other items.

Others are able to collect rainwater.

Another factor related to dengue fever is people's behavior with the long-standing habit of hanging up their clothes, both in urban and rural communities. The habit of hanging clothes in the house is an indication of the Aedes aegypti mosquito's enjoyment of resting [6]. Based on observations in the field, people's habits of hanging clothes are also not good, because there are people who dry clothes in the house and hang clothes in the house because the clothes will be worn again without being washed.

Mosquito control can be achieved through physical, chemical, and biological means. One method of chemical control is the use of mosquito repellent or anti-mosquito medication to repel mosquitoes. Mosquito repellent usually takes the form of a spiral that is burned, lotion that is applied, liquid that is sprayed in the room, and electricity that is installed and emits an odor [6]. However, based on observations in the field, people's habits for preventing mosquito bites are still lacking, such as using anti-mosquito medication and so on. Apart from that, people rarely use mosquito nets when sleeping and install wire mesh in the ventilation of their homes.

There are various programs for preventing and handling dengue fever, namely counseling, fogging, abatement, which is carried out every three months, the 3M Plus PSN movement (community service), cross-sectoral evaluation programs, mobile campaigns, and larval inspections carried out by the North Bontang I Community Health Center, but the case of DHF continues to increase. This is because there is still a lack of public awareness about how to maintain the cleanliness of their environment when carrying out efforts to prevent dengue fever. Apart from that, quite high rainfall during the rainy season can cause stagnant water everywhere, which makes it easy for mosquitoes to breed. The aim of this research is to analyze factors related to dengue hemorrhagic fever (DBD) in Bontang Kuala Village, North Bontang District.

MATERIALS AND RESEARCH METHODS

This study employs an analytical survey method combined with a quantitative research approach. A cross-sectional study was the research design used. The population in this study consisted of 1,791 families withThis study employed a proportional random sampling technique, which involved selecting subjects from each stratum or region, ensuring that the number of sources in each stratum or region was balanced. region. This study included 91 respondents who were heads of families or housewives residing in Bontang Kuala Village, North Bontang District, and did not have physical illness or mental disorders.

Data analysis was carried out with two types of analysis. Univariate analysis was carried out to describe each variable with a frequency distribution table. Bivariate analysis uses the Chi-square test with a level of significance (α) of 5% to determine the relationship between the dependent variable and the independent variable. If ρ value > 0.05, then there is no relationship between the dependent variable and the independent variable; if ρ value ≤ 0.05, then there is a relationship between the dependent variable and the independent variable.

RESULTS OF RESEARCH AND DISCUSSION

Respondent Characteristics

Table 1. Frequency Distribution of Respondent Characteristics in Bontang Kuala Village, North Bontang District

Respondent Characteristics	Total (n=91)	Percentage (%)
Age		
29-32	8	8.8
33-36	9	9.9
37-40	14	15.4
41-44	12	13.2
45-48	12	13.2
49-52	16	17.6
53-56	10	11.0
57-60	3	3.3
61-64	3	3.3
65-68	2	2,2
69-72	2	2,2
Gender		
Man	48	52.7
Woman	43	47.3
Last education		
No school	3	3.3
Finished elementary school	8	8.8
Finished middle school	7	7.7
Finished high school	63	69.2
Diploma	3	3.3
Bachelor/Master	7	7.7
Work		
IRT	37	40.7
Civil servants	25	27.5
Private	19	20.9
Self-employed	8	8.8

Source: Primary Data, 2022

According to the table above, the majority of respondents were aged 49–52 years, namely 16 people (17.6%), and the least were aged 65–68 years and 69–72 years, namely 2 people (2.2%). Most of the respondents were male, with 48 people (52.7%) and 43 female respondents (47.3%). The majority of respondents' last education was high school graduation; 63 people (69.2%) and at least 3 people (3.3%) had no schooling or diploma. The majority of respondents were housewives, accounting for 37 individuals (40.7%), while the least number, 2 individuals (2.2%), were not employed.

Univariate Analysis

Univariate analysis in this study was used to obtain an overview of the frequency distribution of each independent variable and dependent variable.

Table 2. Results of Univariate Analysis of Dengue Disease Variables, Management of Used Goods, Waste Disposal Facilities, Habits of Hanging Clothes and Habits of Using Anti-Mosquito Lotion

Variable	Frequency (n)	Percentage (%)
Dengue fever		
Been sick	51	56.0
Never sick	40	44.0
Management of used goods around the house		
Not good	62	68.1
Good	29	31.9
Waste Disposal Facilities		
Not good	31	34.1
Good	60	65.9
Habit of Hanging Clothes		
Not good	59	64.8
Good	32	35.2
Habits of Using Anti-Mosquito Lotion		
Not good	66	72.5
Good	25	27.5

Source: Primary Data, 2022

According to the table above, as many as 56.0% of respondents have been sick, and 44.0% have never been sick. As many as 68.1% of respondents had poor management of used goods around the house, and 31.9% of respondents had good management of used goods around the house. As many as 34.1% of respondents had poor waste disposal facilities, and 65.9% of respondents had good waste disposal facilities. As many as 64.8% of respondents had bad clothes hanging habits, while 635.2% had good clothes hanging habits. As many as 72.5% of respondents had bad habits of using anti-mosquito lotion, and 27.5% of respondents had good habits of using anti-mosquito lotion.

Bivariate Analysis

Bivariate analysis aims to determine the relationship between the dependent variable and the independent variable. Testing this research hypothesis uses the chi-square test.

Table 3. Results of Bivariate Analysis of Used Goods Management Variables, Waste Disposal Facilities, Habits of Hanging Clothes and Habits of Using Anti-Mosquito Lotion

	Dengue fever (n=91)(%)						
	Been sick		Never Sick		Total		ρ value
	n	%	n	%	n	%	
Used Goods Management							
Not good	48	77.4	14	22.6	62	100	0,000
Good	3	10.3	26	89.7	29	100	
Waste Disposal Facilities							
Not good	21	67.7	10	32.3	31	100	0.164
Good	30	50.0	30	50.0	60	100	
Habit of Hanging Clothes							
Not good	41	69.5	18	30.5	59	100	0.001
Good	10	31.3	22	68.8	32	100	
Habits of Using Anti-Mosquito Lotion							
Not good	44	66.7	22	33.3	66	100	0.002
Good	7	28.0	18	72.0	25	100	

Table 3 shows that the variables that have ρ ≤ 0.05 and are related to dengue fever are the management of used goods around the house (ρ=0.000), the habit of hanging clothes (ρ=0.001) and the habit of using mosquito repellent lotion (ρ=0.002). Another independent variable that has ρ > 0.05 and is not related to dengue fever is waste disposal facilities (ρ=0.164).

The Relationship Between Management of Used Goods Around the House and Dengue Disease

The environment in which the Aedes aegypti mosquito lives is clean, standing water that is not in direct contact with the ground and is not exposed to direct sunlight. Used items such as tires, bottles, plastic, and other items that can hold water can be used for mosquito breeding. The more used items that can hold water, the more places there are for mosquitoes to lay eggs and breed, thereby increasing the risk of dengue fever [7].

The research results indicate a significant correlation between the management of used goods and dengue fever, with 77.4% of respondents who had been sick reporting poor management, and 10.3% reporting good management. This is supported by the results of respondent interviews regarding the use and care of used goods. Some respondents are unable to care for, collect, or recycle used items because they are not accustomed to doing so. Instead, they rely on cleaning staff to transport or clean up waste around the house using rubbish collection vehicles. Apart from that, respondents also left the used items outside the house in an open area so that they could collect rainwater and become a breeding ground for the Aedes aegypti mosquito. If the used goods piled up, some respondents immediately sold them because they lacked empty land to bury them. This research aligns with Ulis's (2018) study, which found a correlation between the presence of used goods and the incidence of dengue fever in the Klagenserut Community Health Center's working area, with a value of 0.002. Other research that supports this is Luluk's (2017) research, which examined the relationship between physical environmental factors and the incidence of dengue fever in the Sekaran Health Center Working Area, GunungPati District, Semarang City, with results (ρ value = 0.026)[8], and Fentia's (2017) research, which stated that there is a relationship between the physical

environment and the incidence of dengue fever in Labuh Baru Timur District with results (ρ value = 0.003)[9].

The Relationship Between Waste Disposal Facilities and DHF

Good waste disposal facilities ensure the availability of suitable and sufficient waste bins that meet the specific requirements of the waste disposal site. Waste is closely related to public health because it harbors various microorganisms that cause disease, as well as insects that transmit or spread disease. If the waste disposal facilities are not adequate, then the management will also be substandard [10]. Therefore, waste must be managed properly until it is as small as possible, so that it does not disturb or threaten public health.

The research results indicate that the majority of respondents who had been sick had good waste disposal facilities, accounting for up to 50%, while 67.7% of those who had been sick had poor waste disposal facilities, as indicated by a value of 0.164. Therefore, there was no significant correlation between waste disposal facilities and dengue fever. This is supported by the results of respondent interviews regarding waste disposal facilities. Waste management for each respondent is generally quite good. Some respondents already have trash cans that are closed and protected from puddles of water or rain. Waste management is not a risk factor for dengue fever, but it is a supporting factor for its incidence. The absence of a relationship between waste disposal facilities and dengue fever can be influenced by intervening variables [5]. In this case, the intervening variable is waste processing. This factor is a shift in people's habits, as they are no longer accumulating rubbish in their homes or surrounding environments. Local policy, specifically the process of collecting and transporting waste from households, supports this effort. Cleaning officers carry out this process daily in the morning (08.00–12.00) and continue it in the afternoon (14.00–16.00), even though not all residents use this paid waste transportation service. This study aligns with Hana's (2019) research, which found no correlation between waste disposal facilities and dengue fever incidence at the Temindung Community Health Center in Sungai Pinang District, Samarinda City, with a value of 0.200. Other research that supports this is Kartika's (2016) research, which states that there is no significant relationship between waste disposal facilities and the incidence of dengue fever and results (ρ value = 0.729)[11], and Indra's (2017) research regarding home sanitation hygiene and the incidence of dengue fever. The study concluded that there was no significant correlation between waste disposal facilities and the incidence of dengue fever in Kapuas Kanan Hulu Village, Sintang Regency, with a value of 0.480 [12].

The Relationship Between the Habit of Hanging Clothes and DHF

Used clothes hanging in the house are a favorite medium for dengue-transmitting mosquitoes, which is one of the risk factors for increasing dengue fever. The habit of hanging clothes in the house is an indication that the Aedes aegypti mosquito likes to rest. This is because the Aedes aegypti mosquito likes to land on clothes hanging in the room to rest after sucking human blood [13].

The research results show that most of the respondents who had been sick had bad clothes hanging habits, as much as 69.5%, and 31.1% had good clothes hanging habits, with a ρ value of 0.001, so there is a relationship between good clothes hanging habits and dengue fever. This is supported by the results of respondent interviews regarding their clothing hanging habits. Some respondents hang their clothes at home so that they can still be worn the next day at work or other activities. In addition, respondents reported finding clothes hung behind the bedroom door, wardrobe door, bathroom, living room, and even on the walls. They also reported finding clothes scattered on the bed or the floor. Some respondents also reported

having clotheslines in their homes, which could potentially serve as a breeding ground for mosquitoes.

It can be concluded that respondents who still hang clothes have a higher chance of contracting dengue fever than respondents who do not hang clothes. Clothes hanging behind the doors and walls of a room or house should be stored in a cupboard, while dirty clothes should be washed immediately. This research aligns with the findings of Ratna and Ekawati's (2020) study, which found a correlation between the habit of hanging clothes and dengue fever in the Margaasih Health Center Working Area, with a value of 0.02. Other research that supports this is by Elvin et al. (2016) regarding factors related to the incidence of dengue fever and outcomes (ρ value = 0.021) [14]. Research from Luluk (2017) states that there is a relationship between the habit of hanging clothes and dengue fever (ρ value = 0.002) [8].

The relationship between the habit of using anti-mosquito lotion and dengue fever

Mosquito repellent is a mosquito repellent (in the form of a liquid that is sprayed or a flat, solid object that is burned). Mosquito repellent is believed to repel mosquitoes quickly and effectively. There are various types of mosquito repellent on the market, ranging from creams, lotions, gels, sprays, stickers, bracelets and so on. The existence of anti-mosquito lotion in the community is a practical solution to repel mosquitoes that is easy to use anywhere and anytime [15].

The research results indicate that 66.7% of the sick respondents had a poor habit of using anti-mosquito lotion, while only 28% had a good anti-mosquito lotion habit, with a p-value of 0.002. This suggests a correlation between the use of anti-mosquito lotion and dengue fever. This is supported by respondent interviews about their anti-mosquito lotion usage habits. To prevent mosquito bites, the majority of respondents use anti-mosquito lotion. Mosquito repellent is easily available in the surrounding environment, and anticipating the threat of dengue fever is the reason why many people use mosquito repellent. This is in accordance with Wahyono and Oktarinda's (2016) research, which states that some people already know how to prevent dengue fever, namely by maintaining cleanliness both inside and outside the house, doing 3M, and using mosquito repellent [16]. However, some respondents were unsure about how to apply anti-mosquito medication or lotion based on the Aedes aegypti mosquito's active hours. They believe that since Aedes aegypti mosquitoes are more active in the morning and evening, they don't require protection against mosquito bites, and therefore, their use of anti-mosquito lotion is minimal.

Aside from that, another factor that influences the presence of the Aedes aegypti mosquito is the use of wire mesh in ventilation holes. A house with ventilation without mosquito screens installed will make it easier for mosquitoes to enter the house to rest and bite humans. Installing wire mesh on ventilation as a preventive measure needs to be done properly so that ventilation or vents cannot be used by mosquitoes to enter and exit the house [17]. Some respondents did not install wire mesh because it could reduce the house's aesthetics, and they felt they needed a room that was free to open so that the atmosphere was cool and not hot. They think that installing wire mesh can only reduce dust entering the house [14].

Using a mosquito net when sleeping is a form of prevention to avoid mosquito bites during sleep [18]. According to interviews, people often hesitate to use mosquito nets while sleeping due to their perceived impracticality. Some respondents stated that using a mosquito net while sleeping had an uncomfortable effect and made the atmosphere feel hot. People tend to prefer using anti-mosquito lotion, which has the same goal, namely to repel and avoid mosquito bites, especially the Aedes aegypti mosquito. This research is consistent with Elvin et al. (2016), who state that there is a relationship between the habit of using mosquito medicine or anti-mosquito and the incidence of dengue fever in the November 19 village of Kolaka Regency [14]. Other research that supports this is Sakinah (2021), which states that there is a relationship between the use of mosquito coils and the incidence of dengue fever (ρ

value = 0.001) [19], and Rima (2017), which states that there is a relationship between the use of mosquito coils and the incidence of dengue fever in Plebang Hamlet, Balerejo District (ρ value = 0.003) [20].

CONCLUSIONS AND RECOMMENDATIONS

According to the analysis results, the variables related to dengue fever are the management of used goods (0.000), the habit of hanging clothes (0.001), and the habit of using anti-mosquito lotion (0.002). Meanwhile, the variable that is not related to dengue fever is waste disposal facilities (ρ = 0.164).

It is recommended for the people of Bontang Kuala Village to install wire mesh on ventilation, immediately wash dirty clothes, carry out PSN through 3M implementation, use anti-mosquito lotion or mosquito nets according to mosquito active hours, and plant and care for plants whose aroma mosquitoes don't like.

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