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Analysis of Risk Factors of Dengue Hemorrhagic Fever in Sub District Tikala, City of Manado

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ABSTRACT

Environmental-based diseases are still a public health problem, one of the diseases that causes factors due to environmental conditions that do not meet health requirements is dengue fever. The purpose of this study was to determine the risk factors for dengue hemorrhagic fever in the Tikala District of Manado City. This study was included in an observational analytic study with a design *Case Control Study*. The independent variables are water storage, waste management and population mobility. Dependent variable is the incidence of dengue fever. The population in this study were all sufferers of dengue fever in 2017, amounting to 91 cases. The total sample of 182 people. Research data were analyzed univariate and bivariate, by calculating Odds Ratio (OR) values. Result: There is a significant relationship between water reservoirs and dengue fever, with a value of $p = 0.007$, OR = 2,037, there is a significant relationship between waste management and the incidence of dengue fever, which obtains $p = 0, 015$, OR = 2,605 and there was a significant relationship between high population mobility and the incidence of dengue fever, which obtained a value of $p = 0.029$, OR = 1.535. There is a significant relationship between water reservoirs, waste management and population mobility and is a risk factor for the incidence of dengue in Tikala District, Manado City.
Suggestion: Water reservoirs to have a cover, cleaned at least once a week, given abate powder and not held more than one week to break the chain of transmission of dengue disease; The need for "3M plus movement" for the community.

Keywords: Shelter Water, Waste Management, Population Mobility and Genesis Dengue

INTRODUCTION

Environmental based diseases are still a public health problem. One disease that causes factors due to environmental conditions that do not meet health requirements is Dengue Hemorrhagic Fever. Dengue Hemorrhagic Fever is an endemic disease in Indonesia. It was first discovered in Surabaya and Jakarta in 1968. The disease is contagious especially in densely populated cities, but in recent years it has been found in rural areas. Dengue Hemorrhagic Fever is transmitted by vectors namely *Aedes aegypti* and *Aedes albopictus mosquitoes*. Nawi (2005) and Hadinegoro (2004), an average of 23,000 sufferers who had to be treated for dengue with 15,231 people dying for 30 years since 1968. WHO categorized Indonesia and other countries such as Thailand, India, Myanmar and Srilangka country with the highest DHF cases in the world (WHO in Widyastuti, 2004).

DHF cases in Indonesia ranks second highest in the world after Thailand. This is due to large population, high population mobility and 90% of regions in Indonesia have dengue cases. The number of DHF sufferers reported in 2007 was 158,115 cases with 1,599 deaths (CFR = 1.01% and IR = 71.78 per 100,000 population). Figures Incidence is highest in Provinsi Jakarta, which is 392.64 per 100,000 population in Provinsi West Sulawesi is 0:20% per 100,000 population and the second lowest in the Provinsi Maluku. While Provinsi with the highest mortality rate in Provinsi Papua is 3.88%.

In Province North Sulawesi, Dengue Hemorrhagic disease was first discovered in 1973 in Manado, then successively spread to various areas in Province North Sulawesi. The incidence rate of dengue hemorrhagic fever is still high, in recent years, *Case Fatality Rate* in 2014 = 1.3%, in 2015 CFR = 1.5%, in 2016 CFR = 1.5 and in 2017 CFR = 1.1%. *Incident rate of* DHF 2014 IR = 90.4%, 2015 IR = 59.6%, 2016 = 86.1% IR 2017 and IR = 52.7% Pro Health Service (Province North Sulawesi, 2017).

Manado city as the capital of Province North Sulawesi in three consecutive years topped that in 2014 the number of cases in 1103 patients with 6 deaths (CFR 0.54%), and in 2015 the decline in the number of cases 668 patients with 8 deaths (CFR 1.2%), in 2016 there was an increase in the number of cases 902 patients with 12 deaths (CFR 1.33%) and in 2017 there were 654 cases with 7 deaths (CFR 1) %) and for *Incident rate (IR* the 2014. 268.0% / 100,000), 2015 (IR. 159.9% / 100,000), 2016 (IR. 216.0% / 100,000) and 2017 (IR. 125.6% / 100,000). The purpose of this study was to determine the risk factors for the occurrence of Dengue Hemorrhagic Fever in the Tikala District of Manado City.

METHODS

This study was included in the observational analytic study design research *Case Control* Study. The independent variables in this study are water storage, waste management and population mobility. The dependent variable is the incidence of dengue fever (DHF). The population in this study were all patients with Dengue Hemorrhagic Fever in 2017 based on report data from the Manado City Health Office, which amounted to 91 cases. The sample size in this study was 182 samples. The instruments used in this study were questionnaires and observation sheets. The research data were analyzed univariate and bivariate, by calculating the Odds Ratio (OR).

RESULTS

1. Relationship of Water Dengue Disease

Reservoirs withThe results of data analysis prove that there is a significant relationship between water reservoirs and the incidence of dengue fever in the Tikala District of Manado City, which obtained a value of $p = 0.007$. For more details, it can be seen in table 1 below:

Table 1. Relationship of Water Reservoirs with Dengue Hemorrhagic Fever in Tikala Subdistrict, Manado in 2017.

Water Reservoirs	Occurrence of DHF				Amount		*p-value*	OR
	Yes		No					
	n	%	n	%	n	%		
Not Eligible	52	59.1	36	40.9	88	100	0,007	2,037
Eligible	39	41.5	55	58.5	94	100		
Total	91	50	91	50	182	200		

Table 1 explains that, when viewed from the OR value = 2.037 then there are water reservoirs that do not meet the requirements, have 2 times the risk will cause dengue hemorrhagic fever compared to the presence of a water reservoir that meets the requirements.

a. Relationship between Management Wasteand DHF incidence

The results of data processing prove that there is a significant relationship between waste management that does not meet the requirements and the incidence of dengue hemorrhagic fever, which obtains value $p = 0.015$. For more details, it can be seen in table 2 below:

Table 2. Relationship between Waste Management and Dengue Disease in Subdistrict Tikala, Manado City in 2017

Waste Management	Dengue Occurrence				Amount		*p-value*	OR
	Yes		No					
	n	%	n	%	n	%		
Not Eligible	24	68,8	11	31,4	35	100	0,015	2,605
Fulfilling Requirements	67	45,6	80	54,4	147	100		
Total	91	50	91	50	182	200		

Table 2 explains that when viewed from the value of OR = 2.605, the waste processing that does not meet the requirements has the risk of 3 times will cause the incidence of dengue fever compared with waste management that meets the requirements.

b. Relationship between Population Mobility and DHF incidence

The results of data processing for population mobility, data analysis proves that there is a significant relationship between population mobility and the incidence of dengue fever, which obtained a value of $p = 0.029$. For more details can be seen in table 3 below:

Table 3. Relationship of Population Mobility with Incidence of DHF in the District Tikala Manado City in 2017

Mobilitas Penduduk	Dengue Occurrence				Amount		*p-value*	OR
	Yes		No					
	n	%	n	%	n	%		
Risk	6	60	4	40	10	100		
No-risk	85	49.4	87	50.6	172	100	0,029	1.535
Total	91	50	91	50	182	200		

Table 3 explains that when seen from the value of OR = 1.535, then the mobility of the population at risk have a chance of causing the incidence of dengue fever by 2 times compared with population mobility that is not at risk.

DISCUSSION

1. Water reservoirs

Water storage is one way for the community to collect and store water in certain containers with the intention that water is always available at all times in houses. This practice is carried out because the need and availability of water that is continuously accessible is still limited, so people tend to hold water for a relatively long time. Unwittingly the habit of storing water besides fulfilling daily needs, it also impacts on the proliferation of various disease vectors. In general, vectors that nest and breed in water are mosquitoes (Slamet, 1996). According to Gubler in Kuno & Rigau (1998) the *Aedes aegypti mosquito* has adapted to the peridomestic environment, developing in water storage. The results of data analysis proves that there is a significant relationship between the water reservoir with the incidence of dengue fever in the district Tikala Manado City, which obtained a value of $p = 0.007$

The results are consistent with research conducted by Erawati (2000). There were 28 patients (57.14 %) of 49 DHF sufferers whose water reservoirs have the opportunity to become breeding places for *Aedes aegypti mosquitoes*. The same study was carried out by Jamilah (2002) that water reservoirs that do not meet health requirements are likely to become breeding grounds for Aedes aegypti mosquitoes. The results of data processing, if seen from the value of OR = 2.037, the existence of water reservoirs that do not meet the requirements of the house, has a risk of 2 times will cause dengue fever compared to homes that have water reservoirs that meet the requirements.

2. Waste Waste

Management Poor Management will negatively affect the community and the environment. In addition to being able to cause conditions that are less comfortable and cause aesthetic disorders, waste can be kept growing and developing media for flies, mice, cockroaches and mosquitoes. One of the diseases whose vectors are mosquitoes and can be caused by waste is DHF.

The results of data processing prove that there is a significant relationship between waste management that does not meet the requirements and the incidence of dengue fever, which obtains a value of $p = 0.015$. Garbage bins that meet the requirements are if they have a lid and are easily emptied so they are easily transported (MOH RI, 1994).mosquitoes *Aedes aegypti* really like to stay and breed in clean water that is not directly in contact with the ground, disease vectors BDB is known to many lay in a puddle of water contained in the rest - the rest tin cans, water tanks, bath and tires, and so. (Ginanjar, 2017).

One of the main things in waste management is the waste storage area, before being disposed / removed, the waste is wrapped in plastic first, to prevent waste from becoming a breeding ground for *Aedes aegypti mosquitoes*.

The results of data analysis for the value of OR OR = 2.605, a house with a waste management system that does not meet the requirements provides a risk opportunity of 3 times will cause the incidence of dengue fever compared with a house that has a waste management system that meets the requirements.

3. Population Mobility

Population mobility can be caused by other factors because most children are not in school and school-age children where transmission can occur in other places, for example in schools, terminals and other environments in the District of Tikala because Tikala District is indeed an endemic area.

According to Gubler in Kuno & Rigau (1998), a risk factor for DHF is an increase in human travel via aircraft, this being an ideal mechanism for the constant transfer of *dengue viruses* between the centers of tropical populations, resulting in the exchange of *dengue viruses* and pathogens other.

The results of data processing for population mobility, data analysis proves that there is a significant relationship between population mobility and the incidence of dengue hemorrhagic fever, which gets a value of $p = 0.029$.

Results of processing data for the value of OR = 1.535, the mobility of people at risk (high population mobility) has a 2 times chance of causing dengue fever, compared to the population mobility that is not at risk (low population mobility).

CONCLUSIONS

1. There is a significant relationship between water reservoirs and dengue hemorrhagic fever events, with a value of $p = 0.007$ and water reservoirs that do not meet the requirements is a risk factor for the incidence of DHF with an OR value = 2,037.
2. There is a significant relationship between waste management and dengue fever, which gets a value of $p = 0, 015$ and waste management that does not meet the requirements is a risk factor for the incidence of DHF with an OR value of 2.605.
3. There is a significant relationship between population mobility in the Tikala District area, which gets a value of $p = 0.029$ and high population mobility is a risk factor for the incidence of DHF with an OR value = 1.535.

SUGGESTIONS

1. Water reservoirs are recommended to have a lid, cleaned at least once a week, given abate powder and not hold more than one week to break the chain of dengue transmission
2. Need to increase the active role of health workers both at the health center and district and cross the sector in enhancing knowledge and attitudes and environmental cleanliness through continuous counseling to the community.
3. The need for a "3M plus movement" is not only in case of an outbreak but must be made a national movement through approaches to the community and adapted to local conditions, collaborating across programs and sectors by utilizing PKK cadres to move PSN.

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