

The Analysis of Environmental Risk and the Use of Repellent on Dengue Hemorrhagic Fever in Kamonji Public Health Center

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ABSTRACT

Dengue Hemorrhagic Fever is an infectious disease caused by dengue virus and transmitted by *Aedes aegypti* mosquitoes. The data of DHF patients of Public Health Department Palu of 2014 were 580 patients, in 2015 were 653 patients and 2016 were 637 patients. The data indicate that the incidence of DHF in Palu City in 2014-2016 fluctuates. This research aims to find out the Environmental Risk Analysis and the Use of insect repellent on Dengue Hemorrhagic Fever at Kamonji Public Health Center Palu. The type of research used in this research is observational research using case control method. The case subjects were DHF patients and the control group was people who did not suffer from DHF in the working area of Kamonji Public Health Center. Case samples were 93 and control 93 by matching sex, age and case location. Sampling was done with total sampling. The research analysis used odd ratio test. The results show that the use of mosquito repellent (OR=3.870 and CI=2.099-7.138), waste processing (OR=2.895 and CI=1.593-5.261), water reservoir (TPA) (OR=2.005 and CI=1.118-3.596), exposure (OR=3.018 and CI=1.660-5.486), and ventilation (OR=2.292 and CI=1.274-4.123) is a risk factor of DHF at Kamonji Public Health Center Area Palu City in 2016. To cope with the risk of DHF incidence should always behave healthy and clean the environment in around the home.

Key words: DHF–Dengue–Environmental Risk–Repellent

1 INTRODUCTION:

Dengue Hemorrhagic Fever caused by virus and transmitted by mosquito is one of public health problem in Indonesia, which tends to widen the spread in line with increasing mobility and population density [1]. According to *World Health Organization* (WHO) of 2016 is characterized by the largest dengue outbreaks worldwide. The American territories report more than 2.38 million cases in 2016, in which Brazil alone accounts for slightly less than 1.5 million cases. The Western Pacific region reports more than 375,000 cases of dengue fever of 2016, where the Philippines reported 176,411 cases and Malaysia 100,028 cases [2].

In 2015, there are 126,675 DHF patients of 34 provinces in Indonesia, and 1.229 people including death. The total

is higher compared to the previous year; there are 100,347 people with DHF and 907 patients died in 2014. This can be caused by climate change and low awareness to keep the environment clean [3].

Profile data of Palu city Health Department, the incidence of dengue disease of 2013 with the number of are 804 and the death of 5 people, in 2014 the number of patients are 580 and the death of 1 person, in 2015 the number of patients that are 653 and death of 3 people, in 2016 the number of patients are 637 and the death of 2 people. From the data in 2013 until 2016 was experience fluctuation [4].

Based on data, the writer are interested in conducting research on “The Environmental Risk Analysis and the use of Repellent on Dengue Hemorrhagic Fever in Kamonji Public Health Center Area”.

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2 METHODS:

The type of research used in this research is analytic observational epidemiological research by using case control method which is done by comparing the two groups of case and control, then traced retrospectively to the presence or absence of risk factor that play a role. Case group is a group suffering from positive effect of illness (patients diagnosed with DHF), while the control group is a group that does not suffer the negative effect of illness (respondents who did not suffer from DHF) which are also viewed retrospectively. The determination of the control group was based on research subject who had gender, age and case location.

The sample case were taken by total sampling method with total sample are 93 respondent with a ratio of case and control is 1:1, then the number of sampel is 186 and the total of the overall sample are 186. Data collection using questionnaire by way of direct observation in the respondent's home. Data analysis used odd ratio test with computer program.

3 RESULTS:

Based on tabel 1. Odds Ratio analysis results (OR) with *Confidence Interval* (CI) 95% showed the risk of using mosquito repellent against the incidence of DHF OR= 3,870 (2,099-7,138), trash processing on DHF incidence OR = 2,895 (1,593-5,261), water reservoir of DHF incidence OR = 2,005 (1,118-3,596), lighting on DHF incidence OR = 3,018 (1,660-5,486) and ventilation of DHF incidence OR = 2,292 (1,274-4,123).

4 DISCUSSION:

Use of Mosquito Repellent:

Aedes aegypti mosquito has a habit of sucking blood, especially in the morning on 08.00-10.00 and most of the afternoon on 15.00-17.00. Female mosquito has a habit of sucking blood from time to time moving from one individual to another. This is because during the day human who become the main food source of blood in a state of active work or move so that mosquitoes cannot suck blood calmly to fullness in one individual. This situation is what causes the spread of DHF becomes easier to occur [5].

The results of this research are also in line with Elvin Tirtasari Amrieds, Pitrah Asfian and Ainurafiq obtained the Chi Square statistical test results show that $p=0,008$ ($p<0,05$) H_0 is rejected, it means that there is a relationship between the use of mosquito repellent with the incidence of DHF in 19 November village of Wundulako district of Kolaka regency of 2016 [6]. However, this research is not in line with the research of Sofia, Suhartono, Nur Endah Wahyuningsih 2014 that states, statistical analysis shows no correlation between the habit of using mosquito repellent to the incidence of dengue fever of respondents in Aceh Besar regency where $p = 0,870$ and OR = 0,9 (95% CI = 0,5-1,7). It is caused by the community that has not fully

realized about the control and the prevention of contacts with mosquitoes in home that is very important to prevent dengue fever [5].

This research was conducted in public health center of Kamonji. The result revealed that respondents who do not use mosquito repellent in the morning and in the afternoon is 3.870 times at risk of experiencing dengue fever than respondents who use it. The result of interviews showed that some respondents never use anti-mosquito in the afternoon but in the night only, they use product such spray, burn, repellent and electric.

Waste Management:

Garbage is closely related to public health, because variety of microorganisms that cause disease (bacteri pathogens), as well as insect animals as disease transmitters (vector) lives in it. Therefore, the waste must be managed properly until it is not disturbing or threatening public health [7].

The research results are also in line with Hadriyati et.al. In obtaining Chi Square Statistic Test results obtained p-value = 0.002 ($p \leq 0.05$), meaning that there is a significant relationship between waste management that meet the requirements of dengue hemorrhagic fever in the working area of public health center Jambi City in 2016 [8]. However, this research is not in line with research conducted by Eudia R. Lumingas, Wulan PJ Kaunang, Afnal Asrifuddin of 2017. The statistical test conducted by Chi-square test shows that there is no correlation between recycling habits to dengue fever incidence in working area of public health center of Tanawangko where p value is 0,314 ($p > 0,05$).

The results of this research revealed that respondents who do not do waste processing is 2.895 times at risk to be contaminated dengue fever than those who do waste processing well, because the result of interview to some respondents revealed that those who do not do the waste management by doing 4R of reuse, reduce, recycle and replace are due to the lack of information about how to manage the waste and how to recycle it.

Water Reservoir:

The existence of Water Reservoir will create opportunities for *Aedes aegypti* mosquitoes to breed. This is because most life-cycle of mosquitoes (eggs, larvae and pupa) occurs in the water with this presence of water reservoirs around the house which will increase the incidence of dengue fever [9].

The result of this research is in line with research conducted by Carundeng et all in 2014. There is a significant relationship between drain of water reservoir to the incidence of dengue fever in the area of public health center Gogagoman Kotamobagu with OR value of 5.9 (95% CI = 2.137-16.342) it can be said that respondents who do not often drain the Water Reservoir is 5.9 times at risk to suffer from dengue fever than those who often drain the Water Reservoir [9]. However, this research is not in line with research conducted by Malau et all, of 2015. It was found that from the analysis result obtained Odds Ratio (OR) = 0,315 (95% CI = 0,031 - 3,176) but Odds Ratio > 1 and the lower limit value of CI < 1 so it can be said that water reservoir for daily purposes is not factor caused dengue fever [10].

Table 1. Tabel 1. Risk Factor on Dengue Hemorrhagic Fever Incident in Working Area of Kamonji Public Health Center

| Risk Factor | DHF Incident | | Control % | Total | OR (CI 95%) |
|---------------------------|--------------|------|--------------|-------|-------------|
| | Case % | | | | |
| Use of Mosquito Repellent | | | | | |
| High Risk | 66 | 71,0 | 36 | 38,7 | 102 |
| Low Risk | 27 | 29,0 | 57 | 61,3 | 84 |
| Trash Processing | | | | | |
| High Risk | 62 | 66,7 | 38 | 40,9 | 100 |
| Low Risk | 31 | 33,3 | 55 | 59,1 | 86 |
| Water Reservoirs | | | | | |
| High Risk | 56 | 60,2 | 40 | 43,0 | 96 |
| Low Risk | 37 | 39,8 | 53 | 57,0 | 90 |
| Lighting | | | | | |
| High Risk | 61 | 65,6 | 36 | 38,7 | 97 |
| Low Risk | 32 | 34,4 | 57 | 61,3 | 89 |
| Ventilation | | | | | |
| High Risk | 57 | 61,3 | 38 | 40,9 | 95 |
| Low Risk | 36 | 38,7 | 55 | 59,1 | 91 |

The results of research revealed that respondents who do not close and drain the Water Reservoir is 2,005 times at risk to be contaminated dengue fever than respondents who close and drain the Water Reservoir. The result of interviews showed that some respondents do not close the water reservoir because they do not have lid, or if they close it will slowing down the water retrieval process.

Exposure:

The lack of exposure and the level of humid of respondents' houses become a potential place for *Aedes Aegypti* mosquitoes to breed [11]. This research is in line to previews research conducted by Ayu Hadiatin Nisa in 2016. It showed that exposure is related to dengue fever. Exposure with a value of $p = 0.004$ (OR = 2,111) [12]. Therefore, this research does not in line to research conducted by Hasanuddin Ishak and Alimin Maidin in 2016. They stated that exposure do not related to the density of *Aedes Aegypti* because the location of ovitrap inside the house generally is in kitchen area and bath room, a place that has a water reservoir [13].

The result of research conducted in public health center of Kamonji revealed that respondent who have unqualified exposure is 3.018 times bigger at risk to be contaminated by dengue fever compare to those who have qualified exposure. The result of observation showed that some respondent owned <20 Lux exposure, therefore no wonder if mosquitoes are nesting inside the house.

Ventilation

Theoretically, unhealthy home conditions can cause various diseases in the house. Houses with inadequate ventilation / insufficient lighting, dense residents, and a large number of clothing that hang in the house are always protected from the sun so that breeding is very convenient for mosquitoes [14].

This research is in line with research conducted by Steven in 2014. Analysis with logistic regression test with backward method of getting ventilation has a significant role or influence on the incidence of dengue fever in the working area of public health center of Rangkah. The significance value of $p = 0.02$ for ventilation, and $p = 0.02$ Ventilation is a risk factor for dengue fever incidence in public health center of

Rangkah [15].

The result of research conducted in public health center of Kamonji revealed that respondent who have unqualified ventilation is 2.292 times bigger at risk to be contaminated by dengue fever compare to those who have qualified ventilation. The result of observation showed that some respondent has less than 10% of ventilation of floor area. The presence of ventilation reduces humidity because mosquitoes like the dark and damp place to release their eggs.

5 CONCLUSION:

The result of this research revealed that people who do not use insect/mosquitoes repellent is 3.870 times at risk of contaminated by dengue fever, respondents who do not close and drain the Water Reservoir is 2,005 times at risk to experience dengue fever than respondents who close and drain the Water Reservoir, respondents who do not do waste processing is 2.895 times at risk for experiencing dengue fever than those who do waste processing well, respondent who have unqualified exposure is 3.018 times bigger at risk to be contaminated by dengue fever compare to those who have qualified exposure, respondent who have unqualified ventilation is 2.292 times bigger at risk to be contaminated by dengue fever compare to those who have qualified ventilation.

Suggestion provided is each people have to understand the dangerous of dengue fever they must feel worry of this disease and they need to take care of themselves and environment of dengue fever.

Conflict of Interest: The authors declare no potential conflict of interest in this research

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