The Relationship Of Waterfood Conditions And The Incident Of Malaria In Waimaringi Village, Kodi Balaghar District, District, Southwest Sumba, East Nusa Tenggara

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ABSTRACT

Malaria is a health problem that can cause death . The high incidence of malaria is closely related to several factors . Such as during the rainy season where spring water flows stagnant, in puddles of rainwater on the ground, and in rock holes. In the dry season, groundwater sources decrease, causing puddles to form along rivers. These puddles of water are used as breeding places. The aim of the research is to determine the relationship between standing water conditions and the incidence of malaria in Waimaringi Village . The type of research used is analytical observational with a cross-sectional approach . Population size 800 respondents. The sample was selected using purposive sampling totaling 267 respondents. . Data analysis used bivariate analysis with the Chi Square test at the degree of significance $\alpha \leq 0.05$. The research results were significant is 0.000 or smaller than 0.05, then Ho is rejected and Ha is accepted where there is a relationship between standing water conditions and the incidence of malaria in Waimaringi Village.

I. Introduction

Malaria is an acute infectious disease caused by the bite of female Anopheles mosquitoes infected with parasites of the genus Plasmodium. The four species that cause malaria are Plasmodium Falciparum, Plasmodium vivax, Plasmodium Ovale and Plasmodium Malaria (Santi et al., 2019). Malaria is a health problem that can cause death, especially in high risk groups such as babies, young children and pregnant women, and can indirectly reduce labor productivity (Ministry of Health of the Republic of Indonesia, 2018).

According to the World Health Organization (WHO) in 2018, the 2017 World Malaria Report estimated that there were 209 million cases of malaria in 90 countries. As a result, around 435,000 people died from malaria. The Ministry of Health noted that 304,607 cases of malaria occurred in Indonesia in 2021. This number increased by 19.9% from the previous year which amounted to 254,055 cases. Malaria cases have increased in the last four years. Based on region, Papua is the province with the most malaria cases, namely 275,243 cases. This number is equivalent to 90.36% of the total cases nationally. East Nusa Tenggara is in second place with 9,419 malaria cases. After that there is West Papua with 7,628 cases of malaria detected. (Ministry of Health, 2021) .

The high incidence of malaria is closely related to several factors. There are several factors that cause malaria which are found in both the rainy and dry seasons. In the rainy season the breeding places for these species are in stagnant springs, in pools of rainwater on the ground, and in rock holes. Often found in ditches where the flow has stopped. In the dry season,

groundwater sources decrease, causing puddles to form along rivers. These puddles of water are used as breeding grounds for Anopheles balabacensis (Arianti Y, and Sukowati S., 2011). Southwest Regency is one of the districts in East Nusa Tenggara Province. This district is a highly endemic area with API figures exceeding the national and provincial API, reaching 19‰ in 2017. Several species of Anopheles spp mosquitoes confirmed as vectors have been found in Southwest Sumba Regency. (SBD Health Office 2017) Malaria cases in Kodi Balaghar District since 2020 have been positive at 254, in 2021 malaria cases have increased with a total of 277 people positive for malaria (Kodi Balaghar district)

II. Method

The type of research used was analytical observational with a cross-sectional approach. Population size 800 respondents. The sample was selected using purposive sampling totaling 267 respondents. Data analysis used bivariate analysis with the Chi Square test at a significance level of $\alpha \leq 0.05$. The research results were found to be significant at 0.000 or smaller than 0.05, so Ho was rejected and Ha was accepted where there was a relationship between standing water conditions and the incidence of malaria in Waimaringi Village. .

III. Result And Discussion

Figure 4.1. Characteristics of respondents based on age of the people in Waimaringi Village, Kec. Kodi Balaghar.

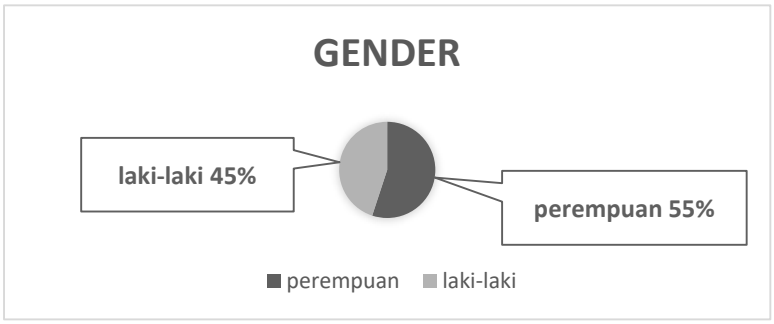

Figure 4.2 Characteristics of respondents based on age of the community in Waimaringi Village, Kec. Kodi Balaghar.

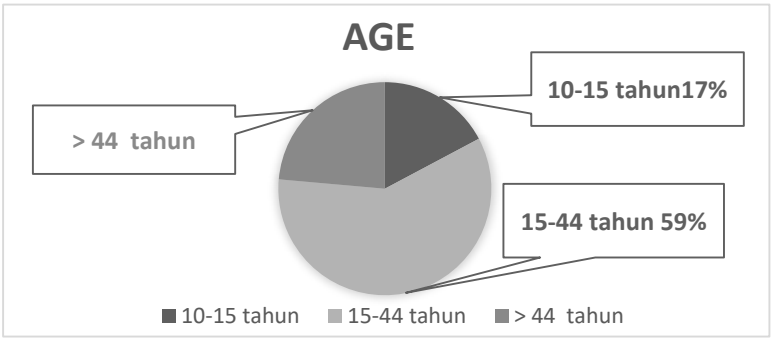

Figure 4.3. Characteristics of respondents based on community education in Waimaringi Village, Kec. Kodi Balaghar.

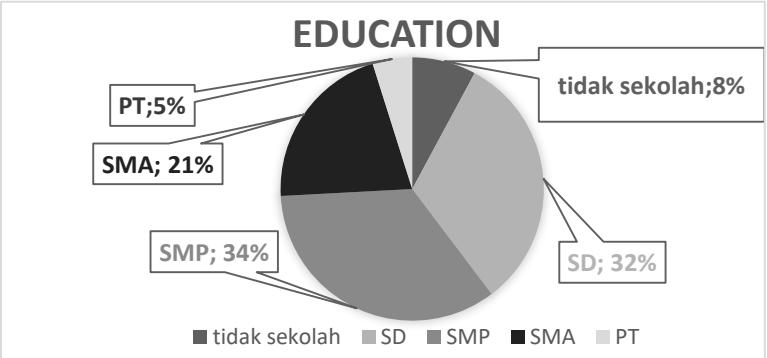

Table 4.4. Characteristics of respondents based on standing water in the community in Waimaringi Village, Kec. Kodi Balaghar (On July 4-18, 2022)
Logistic Regression Test Results

Condition Puddle	F	%
Yes	138	51.7
No	129	48.3
Total	267	100.0

Table 4.5. Characteristics of respondents based on the incidence of malaria in the community in Waimaringi Village, Kec. Kodi Balaghar (On July 4-18, 2022)

Malaria incidence	F	%
Yes	145	54.3
No	122	45.7
Total	267	100.0

Table 4.6 Characteristics of respondents based on cross tabulation between waterlogging conditions and the incidence of malaria in the community in Waimaringi Village, Kec. Kodi Balaghar

Condition puddle	Malaria Occurrence		Total
	Yes	No	
There is	116	22	138
	43.4%	8.2%	51.7%
No	29	100	129
	10.9%	37.5%	48.3%
Total	145	122	267
	54.3%	45.7%	100.0%

Table 4.7 table of statistical test results of the relationship between standing water conditions and the incidence of malaria in Waimaringi Village, Kec. Kodi Balaghar

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	101,881 [a]	1	,000

Based on table 4.7, you can see the results of the Chi-Square Asymptotic Significance test (2-sided) 0.000 < 0.05, so based on the basis for decision making it can be concluded that H0 is rejected and Ha is accepted. Thus, it can be interpreted that "there is a relationship between standing water conditions and the incidence of malaria in Waimaringi Village, Kec. Kodi Balaghar". Thus, if there is standing water, the incidence of malaria will increase.

Identify puddles of water in Waimaringi village

The results of research regarding waterlogging conditions in Waimaringi Village showed that of the 267 respondents, 138 people (83.9%) had waterlogging conditions. The results of research conducted by Siti Berlin (2013) in Lauri Village, Gido District, Nias Regency, obtained different results where the research results showed that there was no standing water around the house.

Lots of standing water can increase the mosquito population around the house, especially the Anopheles mosquito type. The presence of standing water is an important factor in the survival of adult mosquitoes to become dense. Standing water is a preferred place for Anopheles mosquitoes to lay eggs and incubate their eggs (breeding places). This breeding increases the mosquito population so that it becomes a risk factor for malaria because the large population around the house can increase the opportunity for contact with humans (Hustache. S, 2015).

In research that , there is connection between existence puddle with incidence of malaria, p This can accepted Because more malaria transmission high in season drought with A little Rain compared to the season Rain . When season drought with A little rain , puddles are formed is ideal place as place breeding mosquito malaria vector . With increase place breeding mosquitoes , population mosquito Malaria vectors also increase so that possibility happen transmission increasing (Harijanto, 2000).

In Waimaringi Village, when the observation was held, there was a hole filled with open waste water. Lack of behavior to cover holes filled with water will result in the breeding of malaria mosquitoes. Waimaringi Village is on low land with lots of standing water around the houses.

Identification of Malaria Incidents in Waimaringi Village

The results of research on the incidence of malaria showed that of the 267 respondents, 116 people (43.4%) experienced malaria. The results of this research are different from the results of research conducted by Siti Berlin (2013) which was conducted in Lauri Village, Gido District, Nias Regency, which showed that the results of the research showed that the majority of respondents did not experience malaria, namely from 50 people (78.1%) out of a total of 64 respondents. Malaria is a disease caused by plasmodium which is transmitted by the Anopheles mosquito. Malaria disease is described by the incidence of malaria, in this case the Annual Parasite Incidence (API). (Central Statistics Agency, 2021)

API is the morbidity rate per 1000 population at risk in one year. The API number is used to determine the level of malaria endemicity in an area. Malaria endemicity is strongly influenced by poor health systems, increasing resistance to the use of drugs and insecticides, climate change patterns, lifestyle, vector control efforts, migration and population transfer (Central Statistics Agency, 2021).

Based on research in Waimaringi Village, the results showed that the majority of respondents experienced malaria. Apart from standing water, there are still many factors that cause malaria in Waimaringi Village. Such as owning a livestock pen, hanging clothes, not using mosquito nets, and often gardening in areas where there are lots of mosquitoes.

Analyzing the Relationship between Stagnant Water Conditions and Malaria Incidence in Waimaringi Village

Based on the results of the Chi-Square test, it is known that the Asymptotic Significance (2-sided) value is 0.000 < 0.05, so based on the basis for decision making it can be concluded that H0 is rejected and Ha is accepted. Thus, it can be interpreted that "there is a relationship between standing water conditions and the incidence of malaria in Waimaringi Village, Kec. Kodi Balaghar." Thus, if there is standing water, the incidence of malaria will increase.

The results of research conducted by Siti Berlin (2013) regarding standing water around livestock pens and the incidence of malaria in the community in Lauri Village in 2013, the

results of her research showed that there was no significant relationship after being tested statistically between the presence of standing water containing larvae, where $\rho > 0.05$, namely $\rho = 0.071$.

This situation is in accordance with the results of research by Pamela (2015) in Pagelak Village, Banjarnegara, showing that the proportion of houses with standing water has a tendency to cause malaria (p value = 0.005). Likewise, research conducted by Sunarsih, et al (2009) in Pangkalpinang showed that there was a significant relationship between the presence of standing water around the house and the incidence of malaria (p value = 0.02) and someone living in a house where there was standing water around the house. their house has a very large risk of contracting malaria compared to people who live in houses that do not have standing water around their house.

The existence of standing water within a distance of <100 m from around the house has a statistically significant relationship with the incidence of malaria. This can be seen from the p value = 0.003 and the results of calculating the odds ratio (OR) obtained a value of 4.407, indicating that people who live around their house with standing water have a risk of contracting malaria that is 4.407 times greater than those who live at home. where there are no puddles. In the research area, there are many puddles of water left unattended by tin miners. From the results of measuring the pH and salinity of water in puddles at 18 research location points in Koba District, Central Bangka Regency, the pH is between 5.60-6.50 and salt/salinity content 9-13 ‰. The presence of standing water is a suitable breeding place for mosquitoes that cause malaria. In the research area, there were puddles of water, Anopheles vectors were found (Sujari, et al; 2007).

Based on the results of the Chi-Square test (X2) there is a relationship between the presence of standing water and the incidence of malaria (p value = 0.016), while ha The OR calculation results obtained OR=0.37 with 95% CI = 0.16 – 0.84. The OR calculation results show that someone who has standing water around their house has a risk of contracting malaria 0.37 times compared to someone who does not have standing water around their house. The results of this research are in accordance with research conducted by Hermendo in 2008 in Bangka Regency which stated that there was a relationship between the presence of standing water around the house and the incidence of malaria (p value = 0.001) and obtained an OR value = 3.1 with a 95% CI = 1.61 – 6.07. Research conducted by Ahmadi in 2008 in Muara Enim Regency also showed that the presence of standing water around the house was a risk factor for malaria (p value = 0.012). The puddles found in this study were in the form of ditches or ditches where the water was not flowing, holes filled with water around the house, puddles of water on the edge of the beach, and pools where the water was not flowing around the house. The presence of standing water is a breeding place for Anopheles spp mosquitoes. Female mosquitoes will lay their eggs in the water and float on the edge of the water, within 2 - 3 days they will hatch into larvae. Larvae develop through 4 stages or stages, each larva undergoes metamorphosis into a pupa. Pupae within 1 – 2 days become mosquitoes and the length of time from egg to adult mosquito varies depending on the species and the surrounding temperature. Mosquitoes can develop from eggs to adult mosquitoes in at least 10 - 14 days, so that the number of mosquitoes around the house increases (Arsin, 2012)

One of the mosquito behaviors is that they are zoophilic or prefer animals over humans, so the presence of livestock such as buffalo, cows and pigs can also reduce the number of mosquito bites on humans if the livestock pen is placed not far from mosquito breeding areas. Livestock cages must be placed less than 5 meters from mosquito breeding areas so that mosquitoes can still smell the blood of animals in the cage. Livestock pens are a resting place for malaria mosquito vectors, because malaria is a vector that is zoophilic or attracted to animals, so this vector will be found more often in people who care for livestock and of course

people who are close to livestock will be more at risk from mosquitoes that have exophilic properties, namely resting place outside the house.

However, based on research by Mofu (2013), the distance from standing water to the house is one of the risk factors for Anopheles density. This is related to Anopheles' flying ability, namely 1.5 – 2 km.25,26. The results of the correlation test (p = 0.172; r = - 0.535), meaning that there is no relationship between the distance of the water puddle and the density of the Anopheles vector, with moderate strength in the negative direction of 0.535. The closer the distance to the puddle of water to the house, the higher the mosquito density, and conversely, the farther the distance from the puddle, the lower the mosquito density, but this relationship is not significantly different at the 5% error level. There is no relationship between the distance from puddles of water to the house and vector density because the distance from puddles to the house is still within the flying distance of the Anopheles mosquito, namely 1.5 – 2 km.

This is similar to the results of research by Hamdani and Lestin (2019), which showed that the presence of standing water around the respondent's house was not significantly related to the incidence of malaria in the work area of the Loce Health Center, West Reo District, Manggarai Regency, East Nusa Tenggara.

Malaria is an endemic disease in Indonesia. Malaria is an infectious disease caused by parasites (protozoa) from the genus Plasmodium, which can be transmitted through the bite of the Anopheles mosquito. The results of environmental epidemiology studies show that the level of public health or the incidence of disease in a community group is a result of the reciprocal relationship between the community itself and the environment (Nilam. CI, 2013).

Various factors influence the incidence of malaria, namely the respondent's activities outside the house at night, such as staying in the garden when the harvest arrives. Apart from that, other factors such as the presence of livestock pens and the respondent's habit of hanging up their clothes are factors related to the incidence of malaria in the area of Waimaringi Village, Kodi Balaghar District, Regency, Southwest Sumba, East Nusa Tenggara.

Based on the characteristics of respondents who have junior high school education, respondents are also aged 15-44 years. The risk of malaria incidence in individuals with low education is greater than in individuals with higher education. Therefore, it is necessary to carry out activities in the form of cross-sector collaboration with the Education Department to improve public education through out-of-school education where the public is taught about malaria and how to prevent it. In its development, eductive approach steps are needed, namely efforts to accompany (facilitate) the community to undergo the learning process they receive in the form of solving individual, family and environmental health problems (Sarumpet and Tarigan, 2007). The older a person is, the better a person's behavior is in maintaining a clean home environment.

The results of this research show that there is a relationship between standing water conditions and the incidence of malaria in Waimaringi Village, Kec. Kodi Balaghar. The more standing water around the house, the more it will create a place for mosquitoes to breed, resulting in increased cases of malaria in Waimaringi Village. Apart from standing water, there are many other factors that can cause malaria, such as livestock pens where there are many houses on stilts under which there are pigs and chickens for shelter.

IV. Conclusion

1. The results of waterlogging conditions can be explained that of the 267 respondents there were 138 people (83.9%) who had waterlogging.
2. The results of the incidence of malaria can be explained that of the 267 respondents, 145 people (54.3%) had experienced malaria.

3. Based on the results of the Chi-Square test, it is known that the Asymptotic Significance (2-sided) value is 0.000 < 0.05, so based on the basis for decision making it can be concluded that H0 is rejected and Ha is accepted. Thus, it can be interpreted that "there is a relationship between standing water conditions and the incidence of malaria in Waimaringi Village, Kec. Kodi Balaghar".

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