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The Relationship of Puddle Conditions and The Incident of Malaria in Waimaringi Village, Kodi Balaghar District, Southwest Sumba, East Nusa Tenggara

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ABSTRACT
Malaria has been a health issue recently 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 puddle water conditions and the incidence of malaria in Waimaringi Village. 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 H0 was rejected and H1 was accepted where there was a relationship between puddle water conditions and the incidence of malaria in Waimaringi Village.
Keywords: Covid-19, Malaria, Water Puddle Condition

INTRODUCE
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, small 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).

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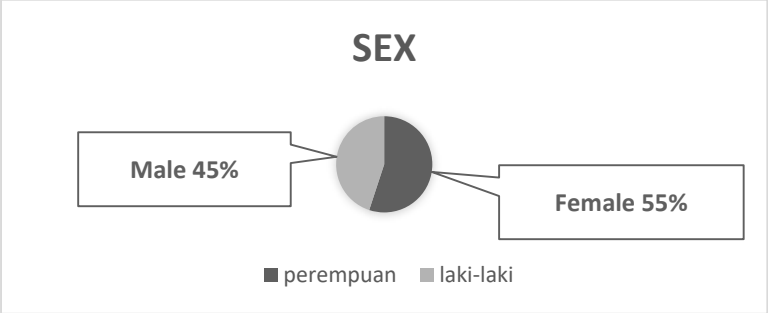
Southwest Regency is one of the districts in East Nusa Tenggara Province. This district is a highly endemic area with API figures exceeding the national and provincial API, reaching 19‰ in 2017. Several species of Anopheles spp mosquitoes have been confirmed as vectors found in Southwest Sumba Regency. (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).

METHODS

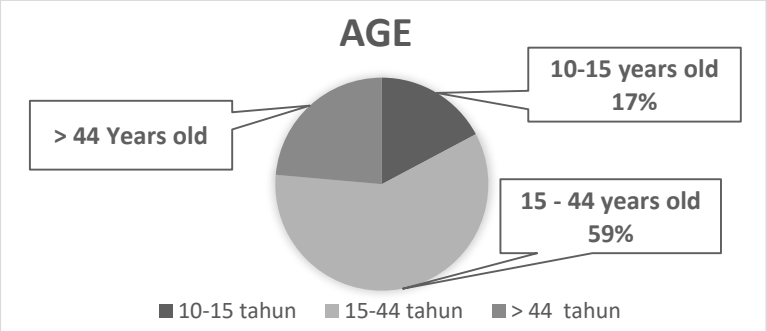
The type of research used was analytical observational with a cross-sectional approach. Population size 800 respondents. The sample was selected using purposive sampling, totaling 267 respondents. Data analysis used bivariate analysis with the Chi Square test at a significance level of $\alpha \leq 0.05$. 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.

RESULT

Picture 4.1. Characteristic of respondents based on the sex type of society in Waimaringi village



Picture 4.2 Characteristic of respondents based on the age type of society in Waimaringi village.



Picture 4.3. Characteristic of respondents based on the level of education in Waimaringi village

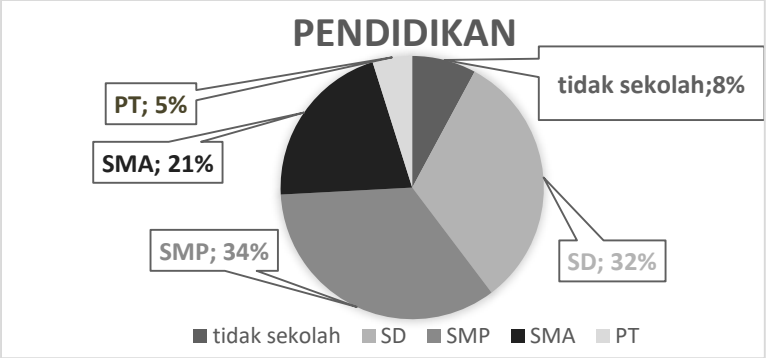


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Table 4.4.Characteristic of respondents based on water puddle in society of waimaringi (the 4th -18th Jully 2022)

Result of Logistic Regression Test

Condition of water puddle	F	%
Yes	138	51.7
No	129	48.3
Total	267	100.0

Table 4.5. Characteristic of respondents based on the incidence of Malaria in Society of Waimaringi village (the 4th -18th Jully 2022)

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

Table 4.6 Characteristic of respondents based on cross tabulation between water puddle condition and the incident of Malaria to the society of Waimaringi village.

Water Puddle Condition	Incidence of Malaria		Total
	Yes	No	
There is	116	22	138
	43.4%	8.2%	51.7%
There isn't	29	100	129
	10.9%	37.5%	48.3%
Total	145	122	267
	54.3%	45.7%	100.0%

Table 4.7 Table of Statistic Test Result the relationship of water puddle condition with the incidence of Malaria in Waimaringi Village.

	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 water puddle conditions and the incidence of malaria in Waimaringi Village, Kec. Kodi Balaghar". Thus, if there is standing water, the incidence of malaria will increase.

DISCUSSION

Identification of Water Puddle 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

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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 Waimaringi Village, when the observation was held, there was a hole filled with open waste water. Lack of behavior to close 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 the Incidence of Malaria 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.

Analysis Relationship of Water puddle condition with the incidence of Malaria 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 $\rho = 0.071$.

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. 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 an increase in malaria cases in Waimaringi Village. Apart from standing

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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.

CONCLUSION

1. The results of waterlogging conditions can be described as showing that of the 267 respondents, 138 people (83.9%) had standing water.
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, District of Kodi Balaghar".

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