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Risk Factors of Malaria Incidence in the Work Area of Wakadia Health Center Muna Regency

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ABSTRACT

Introduction: Malaria has long been one of the highest causes of death in the world, including in Indonesia. For the last three years, Muna Regency has been the area with the highest malaria cases in Southeast Sulawesi, where in 2020 there were 102 cases, in 2021 there were 97 cases, and in 2022 there were 80 cases. This study aims to analyze the risk factors for malaria incidence in the Work Area of the Wakadia Public Health Center, Muna Regency.

Method: This research is a quantitative study using the Case Control Study method. The study population was all patients with microscopic examination results (positive for malaria) in 35 cases. The research sample consisted of a case sample and a control sample totaling 70 people. Data collection was carried out by observation and interviews using a questionnaire. Analysis of the research data was carried out descriptively and inferentially using the Odd Ratio test.

Result: The results showed that air temperature (OR= 3.545) dan habit of using mosquito repellent drugs (OR= 3,273).

Conclusion: Air temperature and habit of using mosquito repellent drugs are risk factors the incidence of malaria in the Work Area of the Wakadia Public Health Center, Muna Regency.

Introduction

According to the 2020 world malaria report, confirmed malaria cases were 172,195,067 or 218 cases per 100,000 population with 77,934 deaths or 45 cases per 100,000 cases. Looking at the prevalence of malaria cases in each endemic country, WHO sets a target that must be achieved by each country through the global technical strategy for malaria program, namely a minimum reduction of 40 cases.[1]

Based on data from the health profile of the Republic of Indonesia, the malaria morbidity rate has increased over the last three years. Where in 2020, the malaria morbidity rate will be 9 per 10,000 population, in 2021 it will be 11 per 10,000 population, and in 2022 it will increase by 15 per 10,000 population.[2] The malaria control program

in Indonesia aims to gradually eliminate malaria by 2030. The Ministry of Health will submit an assessment of malaria elimination certification in Indonesia to the World Health Organization in 2030.[3]

Data from the Southeast Sulawesi Provincial Health Office, the prevalence of malaria in Southeast Sulawesi province in 2022 is still relatively high, namely 9.78 per 10,000 population. For the last three years, Muna Regency has been the area with the highest malaria cases in Southeast Sulawesi, where in 2020 there were 102 cases (23.6%), in 2021 there were 97 cases (27.1%), and in 2022 there were 80 cases. (18.9%).[4]

Based on the preliminary survey conducted, it was found that out of a total of 30 public health center in Muna Regency, for the last three years the Wakadia Public Health Center has always been in the top three health centers with the highest cases of malaria. Where in 2020, there were 18 cases in second place. In 2021, the highest malaria cases were found at the Wakadia Health Center with 17 cases, and in 2022, in second place with 11 cases. With the highest age group in positive malaria sufferers, namely 30 - 45 years.[5]

The Ministry of Health urges the Indonesian people to prevent malaria by cleaning the surrounding environment with running water, spreading larvae-eating fish, closing water reservoirs, sleeping using mosquito nets, and avoiding night activities near water.[6] Environmental factors (temperature, lighting, rainfall, and use of wire netting) are several factors that have a relationship with the incidence of malaria. In terms of behavioral factors, the habit of not staying at home at night or going to endemic areas is also related to the incidence of malaria.[7] Based on the background above, the authors are interested in conducting research on "risk factors for malaria incidence in the working area of the Wakadia Health Center, Muna Regency".

Method

This research is a quantitative study using the Case Control Study method. This research was carried out from March to April 2023 in the working area of the Wakadia Public Health Center, Muna Regency. The research population is the population (infinite). The case population was all people whose blood preparations found Plasmodium based on the results of microscopic examination in 35 cases. The sample in this study was total sampling, namely the entire population of malaria sufferers in the working area of the Wakadia Public Health Center with a case: control ratio of 1: 1, so that the total sample total was 70 samples. Data collection through observation and interviews using research instruments, namely questionnaires.

Result

Table 1 showing the results of the Odd Ratio statistical test, an OR value of 3.545 was obtained, indicating that air temperature is a risk factor for malaria incidence in the work area of the Wakadia Health Center, Muna Regency. Where people with indoor air temperature who are at risk have a risk of 3.5 times experiencing the incidence of malaria
Table 2 the results of the Odd Ratio statistical test showed an OR value of 3.273, which indicated that the habit of using mosquito repellents was a risk factor for malaria in the working area of the Wakadia Health Center, Muna Regency. Where people with the habit of using anti-mosquito drugs are at risk of having a risk of 3.2 times experiencing malaria.

Table 1.
Analysis of Air Temperature Risk Factors for Malaria in the Work Area of the Wakadia Public Health Center, Muna Regency

Air temperature	Malaria incident				Total		Statistic test
	Positive		Negative				
	n	%	n	%	n	%	
Risk	30	85.7	22	62,9	52	74,3	OR = 3.545
No Risk	5	14,3	13	37,1	18	25,7	LL = 1.102
Total	35	100.0	35	100.0	70	100.0	UL = 11.411

Table 2.
Risk Factor Analysis of the Habit of Using Mosquito Repellent Drugs for Malaria Incidents in the Work Area of the Wakadia Health Center, Muna Regency

Habit of Using Mosquito Repellent	Malaria incident				Total		Statistic test
	Positive		Negative				
	n	%	n	%	n	%	
Risk	21	60.0	11	31,4	31	45,7	OR = 3.273
No Risk	14	40.0	24	68,6	38	54,3	LL = 1.224
Total	35	100.0	35	100.0	70	100.0	UL = 8.748

Discussion

Air Temperature with Malaria Incidence

Air temperature greatly affects the short length of the sporogony cycle or the extrinsic incubation period. The higher the temperature (up to a certain limit) the shorter the extrinsic incubation period, and conversely the lower the temperature the longer the extrinsic incubation period.[8]

Based on the results of the study, it was found that as many as 85.7% of respondents who were positive for malaria had temperatures that were at risk, while as many as 37.1% of respondents who were negative for malaria had temperatures that were not at risk. This shows that more people with malaria have a house temperature that is suitable for mosquito life, whereas those who do not suffer from malaria have a house temperature that is not suitable for mosquito life.

This was also reinforced by the results of the Odd Ratio test which found an OR value = 3.545, which means that people with indoor air temperature who are at risk have a risk of 3.5 times experiencing malaria. This result is in line with research that has been conducted where a relationship was found between temperature and the incidence of malaria with a p-value = 0.022 and the OR test results obtained a value of 2.917 which indicates that respondents who have a temperature suitable for mosquito life have a risk of 2.91 times greater than respondents who have temperatures that are not in accordance with the life of mosquitoes, so it can be interpreted that there is a relationship between temperature and the incidence of malaria in Durian Luncuk Village.[9]

This is in line with research Watmanlusy et al. (2019) which states that temperature affects the incidence of malaria, where the results of measurements that have been carried out, the minimum temperature is 24.7°C and the maximum is 27.3°C, the average temperature is 26.1°C. Temperature is one of the physical environmental factors that can affect both the increase in the population of Anopheles sp. and cases of malaria in an area.[10] The results of the study also showed that the number of malaria sufferers had temperatures that matched the life of mosquitoes. from the outside, during the day the air will enter at the bottom of the window and door openings (except for strong winds) and hot air will escape through the upper ventilation holes.

Habit of Using Mosquito Repellent Drugs with Malaria Incidence

Various efforts that can be done to reduce and prevent malaria include using mosquito repellents. Based on the results of the study it was found that as many as 60.0% of respondents who were positive for malaria did not usually use mosquito repellents, while as many as 68.6% of respondents who were negative for malaria used to use mosquito repellents. This shows that there are more people with malaria than people who are not used to using mosquito repellents, whereas those who do not suffer from malaria have a habit of using mosquito repellents.

Out of a total of 38 respondents who used mosquito repellents, 60.5% of them used mosquito coils, and 36.8% used mosquito repellent sprays, and the rest used electric mosquito repellents. Mosquito repellant, this type contains synthetic chemicals (allterin, transflutrin, bioalltherin, esbiothrin and others) that have been formed in such a way that smoke can be delivered to kill mosquitoes and other insects

This research is in line with research conducted by who found that there was a significant relationship between the use of mosquito repellents and the incidence of malaria. Respondents who did not use mosquito repellents every day had a 2.719 times greater risk of

suffering from malaria than those who used mosquito repellents every day.[11] However, this is not in line with other studies where the results of statistical tests obtained a p-value = 0.462, so it can be concluded that there is no relationship between the use of mosquito coils and the incidence of malaria in Sangadji Village, Ternate City.[12]

The use of anti-mosquito lotion at bedtime has been carried out by the majority of respondents both in the group suffering from malaria and the group that does not suffer from malaria. Respondents who are used to using anti-mosquito lotion while sleeping illustrate that they are aware of the dangers of malaria, so they translate this understanding into action, namely protecting themselves from the bites of malaria-transmitting mosquitoes. Even so, there were still some respondents who did not use mosquito repellents at night. Some of the reasons that were disclosed were the problem of unpleasant odors. In addition, the use of anti-mosquito lotion is also felt uncomfortable, because sometimes after using the anti-mosquito lotion, respondents still want to eat food.

Conclusion

Based on the research results, the following conclusions are obtained:

1. Air temperature is a risk factor for malaria incidence in the work area of the Wakadia Public Health Center, Muna Regency in 2023.
2. The habit of using mosquito repellents is a risk factor for malaria incidence in the work area of the Wakadia Health Center, Muna Regency, in 2023.

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