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ENVIRONMENTAL RISK FACTORS AND BEHAVIORS TOWARDS MALARIA IN THE WORKING AREA OF BANYUASIN PURWOREJO HEALTH CENTER

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ABSTRACT

Environmental Risk Factors and Behaviors Towards Malaria in the Working Area of Banyuasin Purworejo Health Center. In 2021, the Banyuasin Health Center's area in Purworejo reported 143 malaria cases, which decreased to 33 cases in 2022. To understand the factors influencing malaria transmission, a case-control study was conducted. The study focused on environmental and behavioral risks within the health center's jurisdiction. The case group included 33 individuals who had malaria in 2022, while the control group comprised 33 individuals without malaria, matched by sex and age. Data was collected through questionnaires, interviews, and observations using Chi-square analysis with a 5% significance level and 95% confidence interval. Significant risk factors identified included the presence of puddles (OR 4.808, 95% CI 1.667–13.862), absence of wire netting on ventilation (OR 4.713, 95% CI 1.341–16.566), not using mosquito nets (OR 7.429, 95% CI 2.461–22.422), not using mosquito repellents (OR 6.042, 95% CI 1.731–21.086), and not wearing tight clothes (OR 5.714, 95% CI 1.925–16.965). Conversely, the absence of a ceiling (OR 3.444, 95% CI 0.641–18.508), absence of cattle (OR 0.320, 95% CI 0.116–0.883), and absence of bushes (OR 2.692, 95% CI 0.631–11.488) were not significant factors. In conclusion, the study highlighted that stagnant water, poor ventilation measures, and inadequate personal protection contribute significantly to malaria risk in the Banyuasin Health Center's area. Improving housing conditions and promoting the use of mosquito nets and repellents are crucial in mitigating malaria transmission effectively in this region of Purworejo.

INTRODUCTION

Malaria is an infectious disease caused by Plasmodium sp. through the bite of Anopheles sp. mosquito. females and has become a health problem in society. (1) Purworejo Regency is the only area in Central Java that has not achieved malaria elimination. Compared to previous years, there was a quite drastic increase in malaria cases in 2021 (555 cases). In Purworejo Regency, Banyuasin Community Health Center is ranked second with the most malaria cases (143 cases) in 2021. (2) The number of malaria cases in the Banyuasin Community Health Center working area has decreased to 33 cases in 2022 and spread to almost all village areas (7 out of 10 villages). (3) The Banyuasin Community Health Center's working area is located in the Menoreh Hills, which has an average height of 213 meters above sea level. This area,

dominated by hardwood plants, mountainous topography, and valleys, is a preferred habitat for the Anopheles sp. mosquito. [4]

The epidemiological triangle theory states that the occurrence of malaria in society is caused by the interaction between three main factors, namely environment, host, and agent. [1] Previous studies have revealed several environmental and behavioral factors that increase the risk of malaria in a given area. Research conducted by Rangkuti et. al. (2017) showed that the presence of standing water, the habit of using mosquito nets, the use of anti-mosquito medication, the habit of leaving the house at night, and the density of clothes leaving the house at night were risk factors for the incidence of malaria in the district. Connection. [5] Another study conducted by Trapsilowati et al. (2016) obtained results from houses that are close to breeding places (puddles of water), houses that are close to coffee or chocolate plantations, the habit of not using mosquito nets when sleeping, and the habit of not using anti-mosquito medication as risk factors for malaria on Sebatik Island. [6]

The results of the preliminary study carried out showed that there were several risk factors in the home environment and behavior of the host (human), which were thought to be the cause of malaria transmission in the working area of the Banyuasin Purworejo Community Health Center. These factors include the presence of standing water around the house, the absence of a ceiling in the house, the absence of wire mesh in the ventilation of the house, the absence of livestock around the house, the presence of bushes around the house, the habit of leaving the house at night, the habit of not using mosquito nets when sleeping, the habit of not using mosquito repellent at night, and the habit of not wearing tight clothing at night. The aim of this research is to analyze environmental risk factors and malaria behavior in the work area of the Banyuasin Purworejo Community Health Center.

MATERIALS AND RESEARCH METHODS

This study employs an analytical observational research style with a case-control design. In 2022, there will be 33 malaria cases in the Banyuasin Purworejo Community Health Center working area. The case population is all malaria sufferers in the period January–December 2022, based on a microscopic diagnosis that was declared positive and recorded at the Banyuasin Purworejo Community Health Center, with a total of 33 people. Meanwhile, the control population is all people who did not suffer from malaria in the period January–December 2022 based on a microscopic diagnosis that was declared negative and recorded at the Banyuasin Purworejo Community Health Center. The case samples in this study were taken using a total sampling technique where the entire case population was used as a case sample, namely 33 people. The control sample was determined based on the inclusion criteria, namely not suffering from malaria in 2022, living close to the case sample within the same neighborhood (RT), gender, and having the same age category as the case sample. The gender and age of the control sample were matched with those of the case sample using a 1:1 ratio to obtain a control sample of 33 people.

The independent variables in this study were determined based on a preliminary study conducted in the work area of the Banyuasin Purworejo Community Health Center. Environmental factor variables include the presence of standing water around the house, the absence of a ceiling in the house, the absence of wire mesh in the ventilation of the house, the absence of livestock around the house, and the presence of bushes around the house. Meanwhile, behavioral factor variables include the habit of leaving the house at night, the habit of not using mosquito nets when sleeping, the habit of not using mosquito repellent at night, and the habit of not wearing tight clothes at night.

Questionnaire sheets and observation sheets were the instruments used in this study. Primary data was obtained directly through interviews with respondents regarding respondent behavior and observations of the respondent's home environment. The primary data collected is then processed and analyzed. Data processing is carried out by editing,

coding, data entry, and tabulating. Following that, the data was analyzed using the SPSS application using univariate and bivariate analyses. Univariate analysis was carried out to determine the frequency distribution of respondent characteristics and each research independent variable. Bivariate analysis consists of a relationship test (chi-square) with a confidence level of 95% and a significance level of α = 0.05, as well as a strength of relationship test (odds ratio/OR).

RESEARCH RESULTS AND DISCUSSION

1. Geographical Conditions at the Research Location

The Banyuasin Health Center's operational area is situated in Loano District, Purworejo Regency, specifically on Jl. Banyuasin, Sebelik Hamlet, and Banyuasin Kembaran Village. The Banyuasin Community Health Center area covers 10 villages out of a total of 21 villages in Loano District. The 10 villages include Rimun, Tepansari, Kaliglagah, Tridadi, Banyuasin Separe, Guyangan, Kemejing, Banyuasin Kembaran, Sedayu, and Ngargosari. The following are the boundaries of the Banyuasin Community Health Center's work area:(7)

a. North : Bener District
b. East : Kulon Progo Regency and Kaligesing District
c. South side : Kaligesing District and Purworejo District
d. West Side : Mudalrejo Village, Kalisemo Village, and VillageKalikalong

The Banyuasin Community Health Center's working area is 26.44 km2, which covers 49.62% of Loano District's total area. The Loano District area is included in the highlands, with an average altitude of 213 meters above sea level. This area is in the Menoreh Hills, where dense vegetation is dominated by perennials. These hills have mountainous and valley topography, with geomorphological processes in the form of denudation (erosion).(4.7)

2. Population at the Research Location

The following is the distribution of population in 2021 based on gender according to villages in the Banyuasin Purworejo Health Center working area:

Table1. Number of Population in the Banyuasin Community Health CenterWorking Area in 2021 Based on Gender

No.	Village	Total population		Total
		Man	Woman	
1.	Rimun	523	531	1,054
2.	Tepansari	897	854	1,751
3.	Kaliglagah	427	403	830
4.	Tridadi	519	535	1,054
5.	Banyuasin Separe	1,051	1,007	2,058
6.	Shame	473	438	911
7.	Kemejing	706	664	1,370
8.	Twin Banyuasin	1,029	983	2,012
9.	Sedayu	858	849	1,707
10.	Ngargosari	576	558	1,134
Total		**7,059**	**6,822**	**13,881**
Percentage (%)		50.9	49.1	100

According to Table 1, the population in the Banyuasin Purworejo Community Health Center working area will be 13,881 people in 2021. Banyuasin Separe Village has the highest population (2,058 people), while Kaliglagah Village has the lowest population (830 people). The male population is 50.9% higher than the female population. (7)

3. Respondent Characteristics

he following are the results of univariate analysis using SPSS on respondent characteristics in the form of age, gender and occupation:

Table2. Frequency Distribution of Respondent Characteristics

No.	Characteristics	Case		Control	
		f	%	f	%
1.	**Age**				
	Productive (15-64 years)	28	84.8	28	84.8
	Unproductive (<15 years and >64 years)	5	15.2	5	15.2
	Amount	33	100	33	100
2.	**Gender**				
	Man	22	66.7	22	66.7
	Woman	11	33.3	11	33.3
	Amount	33	1003	33	100
3.	**Work**				
	Farmer	11	33.3	7	21.2
	Trader	5	15.2	2	6.1
	Employee	2	6.1	6	18.2
	Doesn't work	8	24.2	13	39.4
	Other	7	21.2	5	15.2
	Amount	33	100	33	100

Table 2 shows that the majority of the case group fell into the productive age category with a percentage of 84.8%, as did the control group. Males made up the majority of both the case group (66.7%) and the control group (39.4%). In the case group, 33.3% of the individuals worked as farmers, while 39.4% of the individuals in the control group did not have a job.

4. Environmental factor

The following are the results of a statistical test of malaria environmental risk factors using SPSS in the form of Chi-square and Odds Ratio (OR) analysis with an error rate (alpha) of 5% and a confidence interval (CI) of 95%:

Table3. Statistical Test Results for Malaria Environmental Risk Factors

No.	Independent Variable	Case		Control		*p-value* OR (95% CI)
		f	%	f	%	
1.	**The presence of standing water**					
	There is					0.006
	There isn't any	25	75.8	13	39.4	4,808
		8	24.2	20	60.6	(1,667-13,862)
	Amount	33	100	33	100	
2.	**Absence of Ceiling**					
	There isn't any					0.258
	There is	31	93.9	27	81.8	3,444
		2	6.1	6	18.2	(0.641-18.508)
	Amount	33	100	33	100	
3.	**Absence of Wire Gauze**					
	There isn't any	29	87.9	20	60.6	0.024
	There is	4	12.1	13	39.4	4,713
	Amount	33	100	33	100	(1,341-16,566)
4.	**Absence of Livestock**					
	There isn't any					0.047
	There is	14	42.4	23	69.7	0.320
		19	57.6	10	30.3	(0.116-0.883)
	Amount	33	100	33	100	
5.	**Presence of Bushes**					
	There is					0.303
	There isn't any	30	90.9	26	78.8	2,692
		3	9.1	7	21.2	(0.631-11.488)
	Amount	33	100	33	100	

Risk factors for the presence of standing water around the house in the working area of the Banyuasin Purworejo Community Health Center

Table 3's statistical test results indicate that the case group's home environment had 75.8% more standing water than the control group's 39.4%. The p-value of 0.006 shows that the variable presence of standing water around the house is related to malaria. The OR value of 4.808 and the 95% CI of 1,667–13,862 show that the variable presence of standing water around the house is a risk factor for malaria in the Banyuasin Purworejo Community Health Center working area. Someone whose home environment contains standing water will be at 4,808 times greater risk than someone whose home environment does not contain standing water.

In their research, Junaidi et al. (2015) stated that standing water near the house is one of the risk factors for malaria in the Kuala Bhee Health Center working area (OR value = 4.026 and 95% CI value = 1.667-9.724). The OR value shows that someone in the Kuala Bhee Community Health Center working area who has standing water is 4.026 times more likely to contract malaria than someone who does not have standing water. However, the results of another study by Alamsyah and Ridha (2017) show that the presence of standing water near the house is not a risk factor for malaria transmission in the Lingga Community Health Center working area (OR = 4.41 and 95% CI = 0.466-41.801). (9)

Anopheles sp. mosquitoes. Females use standing water as a breeding place, especially during the aquatic phase (egg-to-pupa stage).5 IIn general, standing water's characteristics have the potential to be a breeding ground for Anopheles sp. mosquitoes. he female is a shallow pool of water that is open, does not flow, is in direct contact with the ground, is quite dirty, and is not contaminated with pollution. (10) The findings are based on observations of standing water around the house, specifically in the group of cases located at a distance of approximately 200 meters from the house. The determination of this distance is based on the active flight distance of the Anopheles sp mosquito, which travels from breeding places (puddles of water) to search for their host's blood, which is approximately 100–200 meters. 11) The types of standing water found were rice fields, puddles, small rivers, large rivers, and spring runoff. Standing water in the form of small rivers The water flow in this small river does not flow fast and tends to stagnate due to changing seasons (from rainy to dry). Apart from that, puddles of water in the form of puddles are often found in locations that are covered by surrounding plants, preventing sunlight from penetrating the puddles. All types of puddles found at the research lsiteare in direct contact with the ground, quite dirty, shallow, and not contaminated by pollution. SAnopheles sp mosquitoes prefer standing water with stagnant conditions like these for breeding. hus, the presence of standing water that has the potential to act as a breeding place around the house (≤200 meters) will have an impact on increasing mosquito density, which will then increase the risk of transmitting malaria to the household residents. (5)

The community can reduce the risk of malaria transmission by routinely monitoring the presence of standing water within a radius of approximately 200 meters around the house. People should either dry out any standing water or replenish it with runoff from springs and puddles to prevent Anopheles sp. mosquitoes from breeding there. Females cannot lay eggs around the house. In addition to this, the community can actively monitor Anopheles sp. mosquito larvae in water puddles, particularly those that cannot be drained or filled up, such as small rivers, large rivers, and rice fields. If there are larvae in the puddles, larvicide should be given immediately so that they cannot grow and develope.

Risk factors for the absence of ceilings in the work area of the Banyuasin Purworejo Community Health Center

The statistical test results in Table 3 show that the majority of the case group and control group do not have ceilings in their houses, with respective percentages of 93.9% and 81.8%. The p-value of 0.258 shows that the absence of a house ceiling has no relationship with malaria. The OR value of 3.444 and the 95% CI value of 0.641–18.508 indicate that the absence of a house ceiling is not a risk factor for malaria in the Banyuasin Community Health Center working area.

Sari (2016) stated in his research that the absence of a house ceiling is not a risk factor for malaria in Putri Hijau District (OR value = 1.6 and 95% CI value = 0.72–3.80). [12] However, other research by Madayanti et al. (2022) shows that the absence of a house ceiling is a risk factor for malaria transmission in the South Jayapura district (OR value = 3.250 and 95% CI value = 1.298–8.136). This value indicates that someone in the South Jayapura district who does not have a ceiling in their house is 3,250 times more likely to contract malaria than someone whose house has a ceiling. [13]

In theory, the absence of a house ceiling allows Anopheles sp mosquitoes to freely enter the house through the gap between the roof and the wall. The absence of a ceiling in the house makes residents more susceptible to being bitten by mosquitoes, especially the endophagic type (which prefers to bite hosts inside the house). However, the results of this study contradict the theory, suggesting that it is not a risk factor. This is due to the fact that the percentage of missing house ceilings between the case group and the malaria control group is nearly identical, indicating homogeneity. In the case group, the majority lacked ceilings in their homes, while some only had ceilings installed in specific rooms. For instance, the ceiling was only installed in the living room, and it was not present in the bedroom or any other rooms. Likewise, in the control group, the condition of the ceiling in their house was similar to that in the case group. These findings indicate that there is no difference in the condition of the house ceilings between the case group and the control group in the Banyuasin Purworejo Community Health Center working area.

Risk factors for the absence of wire mesh in house ventilation in the working area of the Banyuasin Purworejo Community Health Center

The statistical test results in table 3 show that in the case group whose house ventilation did not have wire mesh, a difference of 87.9% compared to the control group, which had only 60.6%. The p-value of 0.024 shows that the variable absence of wire mesh in house ventilation is related to malaria. The OR = 4.713 and the 95% CI = 1.341–16.566 show that the variable absence of wire mesh in house ventilation is a risk factor for malaria in the Banyuasin Purworejo Health Center working area. A person who does not have wire mesh in their house ventilation is 4,713 times more likely to contract malaria than someone who does.

Madayanti et al. (2022) stated in their research that the absence of wire mesh is a risk factor for malaria transmission in the South Jayapura district (OR value = 5.182 and 95% CI value = 1.298–8.136). The OR value shows that a person in the South Jayapura district whose house ventilation does not have wire mesh is 5.182 times more likely to contract malaria than someone who has wire mesh.(13) However, other research by Rangkuti et al. (2017) shows that the absence of wire mesh in house ventilation is not a risk factor for the incidence of malaria in Kec. Panyaconnection (OR value = 1.000 and 95% CI value = 0.061-16.331). [5]

Installing wire mesh in the house's ventilation system is one way to prevent the entry of Anopheles sp. mosquitoes, which are known as malaria vectors. Install wire mesh for ventilation in every room of the house, ensuring it is tight and not damaged. Mosquitoes will freely enter and exit the house if there is no wire mesh installed in the house's ventilation system, if it is installed in only a portion of the room, or if it is installed but in

a damaged condition. The findings were based on observations regarding the absence of wire mesh in house ventilation. It was found that house ventilation, especially in the group of malaria cases, had not had wire mesh installed at all, and there were also those who had installed it, but only in certain rooms. The group of cases that did not install wire mesh argued that they were constrained by costs because they had many other more important needs. ApIn addition, some individuals argue that the absence of wire mesh in the ventilation system makes the house cooler, as it does not block the incoming wind. ntilation that is not installed with wire mesh makes Anopheles sp. mosquitoes. especially the endophagic type) enter the house freely. AsAs a result, the density of mosquitoes in the house will increase, and the possibility of house occupants being bitten by mosquitoes containing Plasmodium sp. (infective mosquitoes) will also increase. , the occupants of the house will be more at risk of contracting malaria. (12)

Risk factors for the absence of livestock around the house in the working area of the Banyuasin Purworejo Community Health Center

The statistical test results in Table 3 show that the case group whose home environment did not contain livestock was 42.4% less than the control group, which was 69.7%. The p-value of 0.047 shows that the variable absence of livestock around the house is related to malaria. The OR value = 0.320 and the 95% CI value = 0.116-0.0883 show that the absence of livestock around the house is not a risk factor for malaria, but rather a protective factor for malaria in the working area of the Banyuasin Purworejo Community Health Center. Protective factors mean that the absence of livestock around the house can reduce the negative impact or risk of malaria transmission.

Research by Wayranu et al. (2016) showed that the presence of livestock near the house is not a risk factor for malaria transmission in the work area ofBanjarmanguu Community Health Center 1. This is because the presence of livestock around the house actually acts as a barrier to malartransmission. on.14 But other research by Junaidi et al. (2015) shows that the presence of livestock near the house is a risk factor for the incidence of malaria in the Kuala Bhee Community Health Center working area. In this research, the presence of livestock around the house acts as a resting place for Anopheles sp. mosquitoes. So someone whose home environment contains livestock will have a 2.673 times greater chance of contracting malaria.(8)

The presence of livestock as a barrier to malaria can be a barrier to mosquito bites on householders, or, in other words, mosquito bites are transferred from humans to animals. Mosquitoes that are full bofsucking animal blood will not bite hhumans. Based on observations, livestock in the form of cows and goats were actually found more frequently in the malaria case group than in the control group. This shows that the presence of livestock in the Banyuasin Community Health Center working area does not act as a barrier to malaria transmission; in fact, the presence of livestock around the house increases the risk of malaria. The distance of livestock from the house that is too close (<10 meters) is most likely the cause of livestock not functioning as a barrier to malaria transmission.

Risk factors for the presence of bushes around the house in the working area of the Banyuasin Purworejo Community Health Center

The statistical test results in Table 3 show that most of the case group and control group had bushes around their houses, with respective percentages of 90.9% and 78.8%. The p-value of 0.303 shows that the variable presence of bushes around the house has no relationship with malaria. The OR = 2.692 and the 95% CI = 0.631–11.488 show that the presence of bushes around the house is not a risk factor for malaria in the work area of the Banyuasin Purworejo Community Health Center.

Wahyudi and Cahyati (2015) stated in their research that the presence of bushes near the house is not a risk factor for malaria transmission in Jatirejo Village.15 However, other

research by Madayanti et al. (2022) shows that the presence of resting places (bushes) near the house is a risk factor for malaria transmission in the South Jayapura district (OR value = 3.512 and 95% CI value = 1.604–7.691). This value shows that someone in the South Jayapura district whose home environment contains a resting place (bushes) is 3,512 times more likely to contract malaria than someone whose home environment does not contain a resting place (bushes). (13)

In theory, Anopheles sp. mosquitoes can use the presence of bushes around the house as a resting place. Anopheles sp mosquitoes use the bushes as a resting place after they have drained the blood of the house's occupants, specifically humans. ush bushes prevent sunlight from penetrating to the ground, so the area becomes damp and shady, smakingmosquitoes like to rest there. The availability of resting places has an impact on increasing mosquito density around the hhouse.herefore, a house with bushes too close to the house (<10 meters) will be at greater risk of contracting malaria compared to a house with no bushes less than 10 memeters. HowHowever, the study's results contradict the theory, indicating that they are not a risk factor. This is due to the fact that the percentage of bushes surrounding the house in both the case group and the malaria control group is nearly identical, indicating homogeneity. the case group, the majority are bushes at a distance of <10 meters from the house. Likewise, in the control group, the condition of the bushes around their house was similar to that in the case group. This homogeneous bush condition is caused by the research location being in the same area, namely in the Menoreh Hills, where these hills have dense vegetation dominated by bushes and perennials. These findings indicate that there is no difference in the condition of the bushes around the house between the case group and the control group in the Banyuasin Purworejo Community Health Center working area.

5. Behavioral Factors

The following are the results of a statistical test of behavioral risk factors for malaria using SPSS in the form of Chi-square and Odds Ratio (OR) analysis with an error rate (alpha) of 5% and a confidence interval (CI) of 95%:

Table4. Statistical Test Results for Malaria Behavioral Risk Factors

No.	Independent Variable	Case		Control		*p-value* OR (95% CI)
		f	%	f	%	
1.	**Habits of leaving the house**					
	Yes	21	63.6	9	27.3	0.007
	No	12	36.4	24	72.7	4,667
	Amount	33	100	33	100	(1,643-13,256)
2.	**The Habit of Not Using Mosquito Nets**					
		22	66.7	7	21.2	0.001
	No	11	33.3	26	78.8	7,429
	Yes					(2,461-22,422)
	Amount	33	100	33	100	
3.	**The Habit of Not Using Anti-Mosquito Medication**					
		29	87.9	18	54.5	0.007
	No	4	12.1	15	45.4	6,042
	Yes					(1,731-21,086)
	Amount	33	100	33	100	
4.	**Habit of Not Wearing Meeting Clothes**					
		26	78.8	13	39.4	0.003
	No	7	21.2	20	60.6	5,714
	Yes					(1,925-16,965)
	Amount	33	100	33	100	

Risk Factors for the Habit of Leaving the House at Night in the Banyuasin Purworejo Community Health Center working area

The statistical test results in Table 4 show that 63.6% more of the case group had the habit of leaving the house at night than the control group, which was only 27.3%. The p-value

of 0.007 indicates that the variable habit of leaving the house at night is linked to malaria. The OR value of 4.667 and the 95% CI of 1.643–13.256 indicate that the habit of leaving the house at night is a risk factor for malaria in the Banyuasin Purworejo Community Health Center working area. Someone who has the habit of leaving the house at night is 4.667 times more likely to contract malaria than someone who doesn't have a habit of leaving the house at night.

Wayranu et al. (2016) stated in their research that the habit of leaving the house is a risk factor for malaria transmission in the work area of Banjarmangu Community Health Center 1 (OR value = 9.073 and 95% CI value = 3.832–21.480). The OR value shows that someone in the Banjarmangu 1 Community Health Center working area who has a habit of leaving the house at night is 9.073 times more likely to contract malaria than someone who does not have the habit of leaving the house at night. [14] However, the results of another study by Saputro and Siwiendrayanti (2015) showed that nighttime activities outside the home were not a risk factor for malaria transmission in Kendaaga Village (OR = 1.990 and 95% CI = 0.621–6.379). [17]

The increased risk of contracting malaria due to the habit of leaving the house at night is closely related to the biting behavior of Anopheles sp. mosquitoes. Specifically, these mosquitoes are exophagic, meaning they prefer to bite hosts outside the home, and they are particularly active during certain hours. Anopheles sp. mosquitoes typically bite from dusk until dawn, between 17.00 and 04.00 hours. 18 The findings based on interviews show that there are many people who still carry out nighttime activities outside the home, especially in the case group. Activities carried out include religious activities, community activities, working, going to other endemic areas, and hanging out. The majority of the case groups engaged in evening religious activities, including congregational prayers at mosques, prayer rooms, and yasinan rituals. The community can take steps to mitigate the current risk of malaria transmission, specifically by limiting nighttime activities outside the home for individuals afflicted with the disease, particularly non-essential ones like social gatherings. Someone who has a habit of leaving the house at night has a greater chance of contracting malaria.

Risk Factors for the Habit of Not Using Mosquito Nets When Sleeping in the Banyuasin Purworejo Community Health Center working area

The statistical test results in Table 4 show that the case group that had the habit of not using mosquito nets when sleeping at night was 66.7% more than the control group, which was only 21.2%. The p-value of 0.001 shows that the habit variable of not using mosquito nets while sleeping is related to malaria. The OR value of 7.429 and the 95% CI value of 2.461-22.422 show that the variable habit of not using mosquito nets when sleeping is a risk factor for malaria in the Banyuasin Purworejo Health Center working area. Someone who has a habit of not using a mosquito net when sleeping will be 7.429 times more likely to contract malaria than someone who has a habit of using a mosquito net when sleeping.

Ristadeli et al. (2013) stated in their research that the use of mosquito nets while sleeping is a risk factor for malaria transmission in Kec. Nanga Ella Hilir (OR = 2.6 and 95% CI =1.2–5.5). From the OR value, it shows that someone in Kec. Nanga Ella Hilir who has a habit of not using a mosquito net when sleeping is at risk of contracting malaria 2.6 times greater than someone who has a habit of using a mosquito net whensleeping..19 However, the results of other research by Junaidi et al. (2015) showed that the use of mosquito nets while sleeping is not a risk factor for malaria transmission in the Koala Bhee Health Center working area (OR value = 1.706 and 95% CI value = 0.742–3.921). [8]

Mosquito nets can protect a person from mosquito bites (especially the endophagic type). Mosquito nets should be used regularly from dusk until dawn (17.00–04.00), considering that this is the active hour for Anopheles sp. mosquitoes. biting its host. Routine use of mosquito nets is an effective way to prevent malaria transmission in the community. [18]

The findings from interviews are as follows: Many people do not routinely use mosquito nets, especially in the malaria case group. They reasoned that sleeping on a mosquito net felt hot and uncomfortable. Apart from that, several respondents felt that malaria cases had subsided, so they decided to remove their mosquito nets. The community can make efforts to reduce the existing risk of malaria transmission, namely by continuing to regularly use mosquito nets, whether there are many malaria cases or not. Someone who does not regularly use a mosquito net when sleeping at night will be more susceptible to direct contact with mosquitoes, increasing the risk of transmission.

Risk Factors for the Habit of Not Using Anti-Mosquito Medication in the Banyuasin Purworejo Community Health Center working area

The statistical test results in Table 4 show that the case group that had the habit of not using mosquito repellent at night was 87.9% more than the control group, which was only 54.5%. The p-value of 0.007 shows that the habit variable of not using mosquito repellent at night is related to malaria. The OR = 6.042 and the 95% CI = 1.731-21.086 show that the variable habit of not using mosquito repellent is a risk factor for malaria in the Banyuasin Purworejo Community Health Center's working area. Someone who has a habit of not using anti-mosquito medication at night will be 6.042 times more likely to contract malaria than someone who has a habit of using anti-mosquito medication at night.

In their 2016 study, Wayranuet al. found that not using mosquito repellent is a risk factor for malaria transmission in the work area of Banjarmanguommunity Health Center 1 (OR value = 9.333 and 95% CI value = 3.372–25.835).). The OR value shows that someone in the Banjarmangu 1 Community Health Center working area who has a habit of not using anti-mosquito medication at night is at risk of contracting malaria 9.333 times greater than someone who has a habit of using anti-mosquito medication night.ht.14 However, the results of other research by Ristadeli et al. (2013) show that not using mosquito repellent at night is not a risk factor for malaria transmission in KecNanga Ella Hilir has an OR value of 2.1 and a 95% Confidence Interval (CI) of 1.1-4.1.).[19]

Using anti-mosquito medication at night can prevent contact between humans and both endophagic and exophagic types of Anopheles sp. mosquitoes. There are several types of anti-mosquito medication that can be used, including topical mosquito repellent, fumigant, aerosol, and electric. [1] Based on interviews, the following findings were obtained: Many people do not use anti-mosquito medication, especially in the malaria case group. They rationalized that they found the use of anti-mosquito coils, particularly those that interfere with breathing, and topical anti-mosquito drugs, which adhere to the skin, uncomfortable. In addition, some individuals argue that they lack the funds to purchase mosquito repellent, citing other pressing needs they must attend to. The community can make efforts to reduce the risk of malaria transmission, namely by routinely using mosquito repellent at night. For people who are not comfortable using certain types of anti-mosquito medication (burnt or topical), they can switch to other types of mosquito repellent, such as electric and spray.

Risk Factors for the Habit of Not Wearing Meeting Clothes at Night in the Banyuasin Purworejo Community Health Center working area

The statistical test results in Table 4 show that the case group that had the habit of not wearing tight clothes at night was 78.8% more than the control group, which was only 39.4%. The p-value of 0.003 shows that the habit variable of not wearing tight clothes at night is related to malaria. The OR value of 5.714 and the 95% CI value of 1.925-16.965 show that the variable habit of not wearing tight clothes at night is a risk factor for malaria in the Banyuasin Purworejo Community Health Center working area. Someone who has a habit of not wearing tight clothes at night will be 5.714 times more likely to contract malaria than someone who has a habit of wearing tight clothes at night.

Mofu (2022) stated in his research that not wearing tight clothing is a risk factor for malaria transmission in the Hamadi Community Health Center working area (OR value = 23.786 and 95% CI value = 2.755-205.338). The OR value indicates that someone in the Hamadi Community Health Center working area is 23.786 times more likely to contract malaria than someone who wears tight clothing. [20] However, the results of other research by Widyasari et al. (2014) show that not wearing tight clothing is not a risk factor for malaria transmission at the Bonto Bahari Community Health Center. [21]

Wearing tight clothing at night, which includes long sleeves and trousers, aims to prevent Anopheles sp mosquito bites. Tight clothing should be worn both when doing activities outside the home and inside the house, considering that there are two types of Anopheles sp. mosquitoes. These mosquitoes, known as exophagic and endophagic types, are actively seeking blood from their hosts. According to interviews, many individuals, particularly those in the malaria case group, do not wear tight clothing such as long sleeves and trousers. Most people think it's irritating to have to wear regular meeting clothes every night. In addition to this, some people only wear long trousers or short-sleeved clothes, and only wear tight clothes when they leave the house or go indoors. The public can make efforts to reduce the risk of malaria transmission, namely by continuing to wear tight clothing at night even when they are at home. Someone who has a habit of not wearing tight clothing at night, both inside and outside the house, will be more susceptible to being bitten by mosquitoes, thereby increasing the risk of contracting malaria.

CONCLUSIONS AND RECOMMENDATIONS

In the Banyuasin Purworejo Community Health Center working area, risk factors for malaria include the presence of standing water around the house, the absence of wire mesh in the ventilation system, the habit of leaving the house at night, the habit of not using mosquito nets when sleeping, the habit of not using mosquito repellent at night, and the habit of not wearing tight clothes at night. The habit of not using mosquito nets when sleeping is the dominant risk factor for malaria, with a 7.429-fold higher risk of contracting malaria. People are expected to continue routinely using mosquito nets when sleeping at night, whether there are many malaria cases or not, to minimize the risk.

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