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The Effect of Community Behavior on The Incidence of Malaria in Sungai Raya Kepulauan

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ABSTRACT

The spread of malaria is determined by factors called Host (host), Agent (plasmodium parasite) and Environment (Environment). The spread of malaria occurs when the three components above support each other. Basically every person can be infected by the agent or the cause of the disease and is the breeding place or the propagation agent (plasmodium parasite). Behavior of society is human behavior or activity of man itself that can support the happening of malaria disease. The purpose of this study was to analyze the effect of community behavior on the incidence of malaria in Sungai Raya Kepulauan Subdistrict, Bengkayang District in 2017. This research type was observational analytic with cross sectional research design. This study wanted to see the effect of community behavior on the incidence of malaria disease during the period of January to July 2017 where two villages (Karimunting and Sungai Keran) become sample of research location. The results obtained from this study there was the influence of behavioral use of bed nets (sometimes) to the incidence of malaria with p-value 0.048. Advice can be given is to avoid and prevent mosquito bites by improving the behavior of clean and healthy life and still use the correct mosquito net while sleeping.

Keywords: Malaria, Behavior, Mosquito

INTRODUCTION

According to WHO data 2014 recorded 198 million cases of global malaria and a cause 584,000 deaths in 2013, while according to World Malaria Report 2015, malaria has attacked 106 countries in the world. Around 3.3 billion people worldwide live in areas at risk of malaria, while 1.2 billion people live in high-risk areas with more cases per 1000 inhabitants(1).

Malaria is still present in all provinces in Indonesia, and malaria morbidity in a region is determined by annual annual parasite incidence (API). API is the number of malaria positive cases per 1,000 population in 1 year(2). Based on data from Ministry of Health (2016) it is known that the number of malaria positive cases per 1,000 population each year decreased, but not yet eliminated.

Based on the results of Bianca et al (2009) conducted in Papua Nuginie area in oil palm plantations in 2008 said that oil palm plantation workers are at greater risk of malaria(3). Research conducted by Andrew Dillon et al (2010) conducted in sugarcane plantations showed a significant relationship to productivity(4). In this study also showed that workers suffering from malaria have a strong relationship to the day does not work and the possibility of hearing due to ingestion of anti-malarial drugs. Overall malaria affects economic growth.

In West Kalimantan the development of oil palm plantations occurs in almost all districts due to large areas of forest and soil structures that are well suited to oil palm plantations. In Bengkayang regency, the expansion of oil palm plantations is not only done by private companies but also by the people. Large clearing of land poses problems such as economic problems, lifestyle changes, the emergence of rare or non-existent diseases due to migrants to oil palm plantation workers.

For malaria vector, the change of breeding place and resting place resulted in the migration of mosquitoes to residential areas. This is in accordance with Bhumiratana et al (2012) research in Thailand which conducted research on rubber plantations, said the change of forest use into plantation land caused the change of mosquito behavior and mosquitoes transfer to residential area which became the increasing factor of malaria case(5).

In Sungai Raya Kepulauan Subdistrict from Health Service data, from 2007 to 2015 is the highest malaria area. In 2007 the number of patients 251 with the number of malaria vivax patients 238, and malaria falcifarum 13 people, in 2008 the number of malaria patients 59 people with vivax patients 34 people, falcifarum 25 people, 2009 the number of malaria patients 42 people with vivax 16 people and malaria falcifarum 26 people.

In 2010 the number of 102 patients with vivax malaria sufferers as many as 84 people and falcifarum malaria patients 18 people. In 2011 the number of malaria patients 68 people with malaria vivax patients 59 people and falcifarum 7 people and malaria mix 2 people, 2012 the number of malaria patients 72 people with malaria vivax 66 people and malaria falcifarum 4 people and malaria mix 2 people, 2013 malaria vivax 57 people, malaria vivax 57 people, malaria falcifarum 1 person and malaria mix 1 person, 2014 malaria number 72 people, malivola malaria vivax 61 people, malaria falcifarum 10 people and malaria mix 1 person, 2015 total malaria patients 60 people with malaria vivax patients 56 people, falcifarum 1 person and malaria mix 3 people, while for 2016 the number of patients 15 people with malaria vivax 7, malaria falcifarum 7 and malaria mix 1 person.

From data reports of malaria disease at the Sungai Raya Islands Public Health Center, showed that Karimunting Village has the highest number of patients from year to year. This is the consideration of the selection of research areas as well as comparing with villages that have the lowest case of malaria that is Sungai Keran Village, to see the effect of community behavior on the incidence of malaria.

METHODS

This type of research was observational analytic research that was research conducted with observations made on the occurrence of environmental health (incidence of malaria disease) in the state as it was without manipulation. The design of this research was cross sectional. This study wanted to see the effect of disease prevention behavior on the incidence of malaria disease in Sungai Raya Kepulauan Subdistrict of Bengkayang District during the period of January to July 2017. Primary data used obtained by interview and observation. Secondary data used was the history of disease data obtained from data Sungai Raya Kepulauan Public Health Center in 2017. The data analysis with Chi-square test in a significance of 95%.

RESULTS

Table 1. Correlation between the behavior of putting mosquito net with malaria incidence

Putting mosquito net	Malaria incidence								Total	
	Karimunting				Sungai Keran					
	+		-		+		-			
	n	%	n	%	n	%	n	%	N	%
Always	27	32.5	7	8.4	5	6.0	5	6.0	44	53.1
Rarely	5	6.0	3	3.6	1	1.2	2	2.4	11	13.2
Never	5	6.0	9	10.8	11	13.2	3	3.6	28	33.7
Total	37	44.5	19	22.9	17	20.5	10	12.1	83	100

Table 1 showed that the majority of respondents in Karimunting village who suffer from malaria always put mosquito nets, 27 respondents (61%) and respondents who do not install mosquito nets have malaria less that 5 respondents. Different cases occurred in the Sungai Keran Village, the majority of respondents in the Sungai Keran village who suffered from malaria did not install mosquito nets, 11 respondents (39%) and respondents who occasionally installed mosquito nets had less malaria that was 1 respondent (9%).

Table 2. Correlation between the behavior of lotion and malaria incidence

Using lotion	Malaria incidence								Total	
	Karimunting				Sungai Keran					
	+		-		+		-			
	n	%	n	%	n	%	n	%	N	%
Always	12	14.4	6	7.2	15	18.1	8	9.6	41	49.4
Rarely	21	25.3	10	12.1	0	0	0	0	31	37.3
Never	4	4.8	3	3.6	2	2.4	2	2.4	11	13.3
Total	37	44.5	19	22.9	17	20.5	10	12.1	83	100

Table 2 showed that the majority of respondents in Karimunting village who suffer from malaria occasionally use lotion, 21 respondents (21%) and respondents who do not use lotion have malaria that is 4 respondents (36%). Different cases occur in Sungai Keran village, the majority of respondents in tap river village who suffer from malaria always use lotion, 15 respondents (37%) and respondents who do not use lotion have malaria that is 2 respondents (18%).

Table 3 showed that the majority of respondents in Karimunting village who suffer from malaria do not use trainning pants, 21 respondents (42%) and respondents who use trainning less experienced malaria that is 16 respondents (48%). The same thing happened in Sungai Keran village, the majority of respondents in Sungai Keran village who suffered from malaria did not use trainning, 13 respondents (26%) and respondents who used less Trainning had malaria that was 4 respondents (12%).

Table 3. Correlation between training Pants behavior and malaria incidence

Using training pants	Malaria incidence								Total	
	Karimunting				Sungai Keran					
	+		-		+		-			
	n	%	n	%	n	%	n	%	N	%
Yes	16	19.2	8	9.5	4	4.9	5	6.0	33	39.75
No	21	25.4	11	13.3	13	15.7	5	6.0	50	60.25
Total	37	44.6	19	22.8	17	20.6	10	12.0	83	100

Table 4. Correlation between anti malaria drug taking behavior and malaria incidence

Taking of anti malaria drugs	Malaria incidence								Total	
	Karimunting				Sungai Keran					
	+		-		+		-			
	n	%	n	%	n	%	n	%	N	%
Always	24	28.9	14	16.9	16	19.4	6	7.3	60	72.27
Rarely	10	12.0	3	3.6	0	0	2	2.4	15	18.00
Never	3	3.6	2	2.4	1	1.2	2	2.4	8	9.63
Total	37	44.5	19	22.9	17	20.6	10	12.0	83	100

Table 4 showed that the majority of respondents in Karimunting village who suffer from malaria always take anti-malarial medication, 24 respondents (40%) and non-beneficiate respondents have malaria less that is 3 respondents (38%). Similarly, in Sungai Keran village, the majority of respondents in the tap river village who suffer from malaria always take anti-malarial medication, 16 respondents (27%) and non-beneficiate respondents have malaria less than 1 respondent (13%).

Furthermore, presented analysis results using logistic regression between dependent variable and independent variable.

Table 5. The result of logistic regression test

Number	Independent Variable	P Value	Odds Ratio (OR)
1	Net	.400	
2	Net; always	.999	.000
3	Net; rarely	.048	.145
4	Net; never	.246	.061
5	Lotion	.905	
6	Lotion; always	1,000	3342825082.625
7	Lotion; rarely	.334	.322
8	Lotion; never	1.000	122945028.023
9	Training Pants	.803	
10	Training pants; yes	.732	.453
11	Training pants; no	.519	.546
12	Anti Malaria Drugs	.771	
13	Anti malaria drugs; always	1.000	.000
14	Anti malaria drugs; rarely	1.000	.000
15	Anti malaria drugs; never	1.000	.000
	Constant	1.000	711810043.576

Based on table 5 it is known that the category of netting (sometimes) which means that the behavior of people who sometimes put a mosquito net has an effect on the incidence of malaria disease of 0.145 times than in the netting category with a significance level of 0.048 or less than 0.05. Another variable has a significance value above 0.05, then the variable has no effect on the incidence of malaria.

Table 6. Different Test by using Kruskall Walls

Number	Independent Variable	P Value	Information
1	Putting nets	0.324	There is no difference
2	Using lotion	0.455	There is no difference
3	Using Training Pants	0.619	There is no difference
4	Taking anti malaria drugs	0.869	There is no difference

Based on table 6 it can be seen that there is no difference between variables. Different test was performed using Kruskall Walls test between dependent variable and independent variable of Karimunting Village and Sungai Keran Village. All variables have a value of p value greater than 0.05.

DISCUSSION

Behavior of Putting mosquito net

The results showed that the occasional behavior of putting a mosquito net had an influence with the incidence of malaria. This is because they are less interested in using bed nets while sleeping, the weather is hot because it is a coastal area. Mosquito bites can occur during nighttime activities such as religious activities they do once a week, either in places of worship or from house to house. Some studies explain that respondents who sleep without using mosquito nets are at greater risk of malaria compared with respondents who sleep using mosquito net[6].

Using mosquito nets regularly and correct installation at night is a protection that can reduce the incidence of malaria, either insecticide or non-insecticide treated nets are properly installed. However, it is better to use insecticide-treated bed nets[7]. In respondents who wear mosquito nets but still exposed to malaria, this can be caused by the use of a mosquito net that is not correct or the physical condition of the netting that has been torn or damaged. According to the researchers, respondents who do not use bed nets during sleep at night because there are still not realized the importance of efforts prevention in the form of behaviors that support malaria control efforts.

Hung et al. (2002) explained that the malaria control intervention in Vietnam was successful because the intervention was done by using insecticide-treated bed nets, microscopic early diagnosis and treatment of parasitemic patients and carried out in conjunction with the improvement of health education programs so as to increase public participation in intervening[8]. However, research conducted in Kota Bima shows that there is no relationship between the habit of using mosquito nets with malaria incidence where OR = 1, meaning no association was found[9].

Behavior of Using Lotion

Behavior using lotion, statistically has no effect on malaria incidence. This is because the use of lotions is less effective to avoid mosquito bites because lotions easily disappear with the activities of respondents who work as fishermen and wage workers seaweed plants. Lotion is also easily lost due to sweat with hot weather. This study is in accordance with Molaku *et al*. (2017) which states there is no relationship between the use of anti-mosquito (lotion) drugs with malaria events[10].

Majority respondents stated that sometimes they use lotions or anti-mosquito coils, meaning they have minimized mosquito bites but have not done so optimally. This finding is different from the findings of Santy et al. (2014) which states that there is a relationship between the use of anti-mosquito drugs with malaria incidence with p value = 0.041 and OR = 2.1712[11]. However, in line with research conducted by Anjasmoro (2013) in the work area of Rembang Public Health Center in Purbalingga District which states that there is no relationship between the use of mosquito repellent with malaria incidence (p = 0.7590). This can happen because human health is influenced by several factors[12].

Behavior of Using Training Pants

The results statistically using training did not affect the incidence of malaria. This is because training for respondents in Karimunting Village and Sungai Keran Village is not the clothes used for sleeping, but the clothes used to work especially those who work in oil palm plantations. But for the farmers of the garden wage farmers, they do not use training clothes, because the location of clove plantation is located in the hilly area. The majority of respondents use a sarong as a cover body at night or use shorts. Clothes are used also just wearing a short sleeve shirt. The results of this study are not in line with the results of research Rangkuti *et al*. (2017) which states that there is a significant relationship between the use of clothing with the incidence of malaria[13].

The customs of the people in Karimunting Village and Sungai Keran Village in night out activities are more common during religious activities. This allows them to be bitten by larger mosquitoes if they do not wear tight clothing or long wear clothing. The habit of wearing tight or long clothing will reduce the risk of Anopheles mosquito bites and will be very risky to people who come out with clothes that are not meeting. Clothes density can be a long-sleeved shirt and also cover most of the limbs. If the habit inside and outside the house still use clothing meetings then the exposure and mosquito bites will be reduced. Babba (2007) study, which states that people who have a habit of going out at night without using protective clothing have a risk of malaria 5.5 times greater than those who do not have a habit of going out at night[14]. This result is also confirmed by Dale, *et al.* (2010) which states that the high intensity of transmission of malaria can occur in people who do activities outside the home at night[15].

Behavior of Taking of anti malaria drugs

The statistics, the behavior of taking anti-malarial drugs did not affect the incidence of malaria, this is because they take anti-malarial drugs not as a prophylactic drug but they take anti-malarial drugs as malaria drugs when they begin to feel the symptoms of malaria such as fever and chills. They come to the public health center

when the malaria drug is not healed, this causes the results of the laboratory examination of the health center is negative. Dissatisfied with the results of the laboratory examination of the public health center, so decided to opt for medical treatment at a higher cost. The results are different from the hospital laboratory, because there is a time lag between the time to go to the public health center and the hospital, which causes their low visits to the public health center when they feel malaria symptoms. This study is in line with Tan Heng Soon et al. (1982) who say there is resistance to malaria drug use in society[16].

CONCLUSION

The habit of using lotions, using trouser training, and wearing lotions has no effect on the incidence of malaria and the behavior of using mosquito nets associated with the incidence of malaria. Avoiding and preventing mosquito bites by improving clean and healthy living behavior and using mosquito nets properly during sleeping, wearing lotions, training and anti-malarial drugs.

REFERENCES

1. Jamil KF. Clinical Manifestations, Therapeutic Response and Polymorphism of the Merozoite Surface Protein Genes 1 and 2 of Malaria Falcifarum Patients in Aceh Province (Manifestasi Klinis, Respon terapi dan Polimorfisme Gen Merozoite Surface Protein 1 dan 2 Penderita Malaria Falcifarum di Propinsi Aceh). Disertasi. Yogyakarta: FK UGM; 2016.
2. Kemenkes RI. Data and Information of Indonesia Health Profile 2016 (Data dan Informasi Profil Kesehatan Indonesia 2016). Jakarta: Kementerian Kesehatan Indonesia; 2106.
3. Bianca P, Mulle I, Levi D, King G, Smith AT, Lengler C. Malaria-a Major Health Problem Within an Oil Palam Plantation Around Popondeta. Papua Nuginea. Malaria Jurnal. 2009. doi:10.1186/1475-8-56
4. Dillon A, Jed F, Pieter S. Experimental Estimasi of the Impact of Malaria Agricultural Worker Productivity, Labor Supply & Earnings. 2010.
5. Bhumiratana A, Sorosjhinda PN, Wultichai K, Pannamas M, Suntonr P. Malaria-associated Rubber Plantations in Thailand. Travel Medicine and Infectious Disease. 2013;11:37-50.
6. Honrado ER, Fungladda W. Social and Behavioral Risk Faktors Related to Malaria in Southeast Asia Countries. Bangkok: Department of Tropical Medicine, Faculty of Tropical Medicine, Mahidol University; 2003.
7. Depkes RI. Dynamic of Malaria Transmission (Dinamika Penularan Malaria). Jakarta: Sub direktorat Malaria. Ditjen PPM & PL; 2003.
8. Hung, Le Q. Control of Malaria: a Successful Experience from Vietnam. Bulletin of the World Health Organization. 2002;80:660-666.
9. Rubianti I, Wibowo TA, Sholikhah. Risk Factors of Malaria in the Working Area of Puskesmas Paruga Public Health Center in Bima City of West Nusa Tenggara (Faktor-Faktor Risiko Malaria Di Wilayah Kerja Puskesmas Paruga Kota Bima Nusa Tenggara Barat). Jurnal Kesmas UAD. 2009;3(3).
10. Molaku WAY, Umboh JML, Sondakh RC. Description of Use of Anti Mosquito, Mosquito Netting, Wire and Mosquito Breeding Area in Work Area of Motoboi Small Health Center Kotamobagu City (Gambaran Penggunaan Bahan Anti Nyamuk, Pemakaian Kelambu, Kawat Kasa dan Tempat Perindukan Nyamuk di Wilayah Kerja Puskesmas Motoboi Kecil Kota Kotamobagu). 2017. Available from: https://ejournalhealth.com/index.php/kesmas/article/viewFile/476/464
11. Santy FA, Natalia D. Correlation of Individual and Environmental Factors with Malaria Incidence in Ayak 3 River Village Belitang Hilir District (Hubungan Faktor Individu dan Lingkungan dengan Kejadian Malaria di Desa Sungai Ayak 3 Kecamatan Belitang Hilir), Kabupaten Sekadau. eJKI. 2014;2(1):265-272
12. Anjasmoro R. Factors Associated with Malaria Incidence in the Working Area of Rembang Public Health Center of Purbalingga District (Faktor-Faktor yang Berhubungan dengan Kejadian Malaria di Wilayah Kerja Puskesmas Rembang Kabupaten Purbalingga). Jurnal Kesehatan Masyarakat. 2013;2(1). Available from: http://ejournals1.undip.ac.id
13. Rangkuti AF, Sulistyani, EndahNW. Environmental Factors and Behavior Associated with Malaria Incidence in Panyabungan Mandailing Natal District of North Sumatra (Faktor Lingkungan dan Perilaku yang Berhubungan dengan Kejadian Malaria di Kecamatan Panyabungan Mandailing Natal Sumatera Utara). BALABA. 2017;13(1):1-10.
14. Babba I. Risk Factors Affecting Malaria Incidence (Case Study in Work Area of Hanadi Public Health Center of Jayapura City (Faktor-faktor Risiko yang Mempengaruhi Kejadian Malaria (Studi Kasus di Wilayah Kerja Puskesmas Hanadi Kota Jayapura). Jurnal Epidemiologi. 2007.
15. Dale M, Ndoen E, Wild C, Dale P, Sipe N. Relationships between Anopheline Mosquitoes and topography in West Timor and Java, Indonesia. 2010. Available from: http://www.ncbi.nlm.nih. gov/pmc/articles/PMC2939620.
16. Soon TH, Eng TP. Treatment Failure of Falcifarum Malaria with Fansidar in Tawau Sabah, Januari-June.1982. Med.J.Malaysia. 1983;38(3).