

Original Research Article

Malaria Related Knowledge, Practice and Behavior of People in South Halmahera, Indonesia

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ABSTRACT

Eastern parts of Indonesia are well known as malaria high incidence areas. This study aimed to describe malaria-related knowledge, practices and behavior in high endemic areas of malaria in South Halmahera district. This descriptive study used probability proportional to measure method for cluster selection in study areas i.e., West Gane (WG) and East Gane (EG) sub-districts. Each area, there were 15 clusters, 405 households (HH), and maximum 2025 respondents (5 from each HH) involved in the study. Knowledge, practice, and behavior of people related to malaria were assessed using a standardized questionnaire. Field workers were trained and by using Personal Digital Assistance entered answers from respondent directly. Results revealed that totally there were 4050 respondents ranged from below five until above 50 years old. From those above 5 yr old who knew about malaria (86.7%), only 45.5% knew that malaria was caused by mosquito and 54.5% knew that mosquito bite inside and outside of the house. Knowledge on symptoms and treatments were relatively low particularly in EG compared to WG (33.7% vs. 74.0% and 19.2% vs. 58.5%, respectively for symptoms and treatment). In addition, most of those who knew malaria said that they agreed malaria is a dangerous disease and they could be infected but only 40.5% knew how to treat. Out of 810 HH, only 49.0% used bed net but only 63.5% consistently used the bed net every night. In addition, mosquito coil was used more in WG than in EG (43.4% vs. 1.9%).

Conclusion: We conclude that knowledge, practice, and behavior about malaria were very low especially in EG. Health education should be prioritized as indispensable activity in malaria controlling program.

Keywords: Malaria, knowledge, practice, and behavior.

INTRODUCTION

Malaria, a major public health problem in the world, is a public health concern in Indonesia. Eastern parts of Indonesia are well known as areas with high incidence of malaria. North Maluku Province was ranked as the third highest morbidity rate of malaria in Indonesia in 2005 at 67.24 per 1000 population. Moreover, the first semester in 2007, South Halmahera district recorded 44 clinically

symptom of malaria cases. It was much higher rate compared to the target of *Indonesia Sehat 2010* that morbidity rate of malaria should be 5 cases per 1000 populations.

Malaria is influenced from a range complex interaction of agent, host and environment. Previous studies ^[1-2] suggested that demographic characteristics play important role on malaria transmission. Similarly, knowledge, habits, behavior and

socioeconomic status of the community are well known as host characteristics that determine malaria transmission. [3-4] As shown in the study, wealth status of the family influenced the family to purchase bed net which is a critical factor to prevent from mosquitoes bites. In addition, human behavior needs to be examined properly in order to understand the risk of malaria at individual and community level. [5] These factors include vector control measures like using bed net, cultural believe, and health seeking behavior, which may be dealing with ineffective methods of treatment, lack of knowledge to recognize malaria symptoms and prevention. Moreover, human activities can create breeding sites for larvae standing water in irrigation ditches. Agricultural work such as harvesting (also influenced by climate) may force increased nighttime exposure to mosquito bites.

Studies on knowledge, practice and behavior of community on malaria have been done in some endemic areas. [6-7] Most studies were done in area with low socioeconomic status and limited education. Therefore, lack of knowledge on different aspects of malaria was found. In addition, practice as well as behavior toward preventing malaria was very limited regardless health education program was conducted as part of overall malaria controlled program. However, results from the study were very needed to provide better malaria control program in the future. This present study was intended to describe malaria-related knowledge, perception and practices in an endemic area in Northern Maluku, Indonesia.

MATERIALS AND METHODS

This was a descriptive study. This study used probability proportional to size method for cluster selection. Survey software was used to select clusters. This software requires name of villages and

number of population. These two required data were obtained from East Halmahera District Health Office based on report from community health centers (called Puskesmas). Then, sample clusters were selected from a list of all clusters using the probability proportionate to size (PPS) method. List of selected cluster are as follows in West Gana and East Gana consisting 24 villages.

Cluster random sampling was employed in this study. Fifteen clusters, which is a village-base, were drawn in each sub district by using probability proportional to size. Therefore, a village that has higher number of population was more likely to be selected as a cluster. There were 30 clusters from two sub districts. Furthermore, 11 households were selected randomly in each cluster. Finally, maximum 5 participants were interviewed in every selected household. Accordingly, there were 30 clusters, 810 households, 4050 respondents involved in this study.

Data collection was performed by trained field workers (FW). They were intensively trained by researchers for 4 days to perform all collecting data activities including how to use the standard questionnaire. Data collection was done for one year period whereas each month FW did data collection during 15 days in one or two clusters and then moved to other clusters for the next month. This was done since FW should find also monthly morbidity of malaria during one year period (not reported in this study) in these endemic areas. A standard questionnaire was developed and tested prior to data collection. Questions about knowledge, practice, and behavior of each respondent were put in a device called PDA (Personal Digital Assistance; Socket, USA). This device was used to reduce unnecessary systematic errors during interview. FW entered the answers directly to the device during interview. Furthermore,

the data was linked directly to the center of data management at Gajah Mada University, Yogyakarta. Data, then, was cleaned and analyzed descriptively.

RESULTS

Characteristics of respondent and household

Table 1 showed a characteristic of sample in the study. There were 54.5% male and 45.5% female in this study.

Table 1. Characteristic of respondents in South Halmahera, 2012

Variables	West Gane (n=2025)		East Gane (n=2025)		Total	
	n	%	n	%	n	%
Sex						
Men	1045	51.6	1164	57.5	2209	54.5
Women	980	48.4	861	42.5	1841	45.5
Age						
< 5 years	330	16.3	251	12.4	581	14.3
5 – 9 years	344	17.0	292	14.4	636	15.7
10 – 29 years	610	30.1	516	25.5	1126	27.8
30 – 49 years	516	25.5	674	33.3	1190	29.4
≥ 50 years	225	11.1	292	14.4	517	12.8
Marital status						
Not Married yet	1144	56.5	899	44.4	2043	50.4
Married	826	40.8	1112	54.9	1938	47.9
Divorced living	8	0.4	14	0.7	22	0.5
Divorced dead	47	2.3	0	0.0	47	1.2
Educational level						
Illiteracy/not in school yet/not graduated of elementary school	883	43.6	356	17.6	1239	30.6
Graduated of elementary school	535	26.4	899	44.4	1434	35.4
Graduated of junior high school	300	14.8	440	21.6	740	18.3
Graduated of senior high school	287	14.3	330	16.3	617	15.2
Graduated of academy	20	1.0	0	0.0	20	0.5
Occupational						
Farmer/Fisherman	612	30.3	928	45.8	1540	38.0
Civil servant/police/soldier/pension	28	1.4	14	0.7	42	1.1
Businessman	63	3.1	67	3.3	130	3.2
Private workers	40	2.0	0	0.0	40	1.0
Unemployed	1258	62.1	925	45.8	2183	53.9
Others	24	1.2	91	4.6	115	2.8

Mostly respondents were in reproductive age at 30-49 year-old (29.4%) and 10–29 year old (27.8%). It shows that 30.6% of respondents in this study those were not in school yet and 35.4% was only graduated from elementary school. Accordingly, 38.0% of respondents was farmers while 53.9% has no occupation.

Knowledge of controlling malaria

Knowledge about malaria was shown in Table 2. Most of respondent beyond 5 yr old (86.7%) have heard about malaria with the local symptom with fever. However, 98.0% of those who knew malaria did not know whether virus, bacteria or plasmodium could lead to malaria.

In addition, almost half of respondent (45.5%) who knew about malaria agreed that mosquito would distribute the disease and around half also knew that mosquito bite both outside and inside the house. Besides, there were 86.4% in West Gane and only 28.8% in East Gane knew breeding place of malaria. In addition, 74% in West Gane and only 33.7% in East Gane knew about symptom and signs about malaria.

Moreover, 82.9% said that everybody have a risk to get disease. Furthermore, 58.5% in West Gane 19.2% in East Gane knew treatment.

Table 2. Knowledge about malaria of respondents (≥ 5 years) in South Halmahera, 2012

Variables	West Gane		East Gane		Total	
	n	%	n	%	n	%
Know about malaria *)						
Yes	1632	96.3	1377	77.6	3009	86.7
No	63	3.7	397	22.4	460	13.3
Causes of Malaria						
Virus	3	0.2	0	0.0	3	0.1
Bacteria	31	1.9	0	0.0	31	1.0
Plasmodium	0	0.0	26	1.9	26	0.9
Don't know	1598	97.9	1351	98.1	2949	98.0
The way of malaria infection						
Fly	20	1.2	0	0.0	20	0.7
Mosquito	788	48.3	582	42.3	1370	45.5
Animal	5	0.3	14	1.0	19	0.6
Don't know	819	50.2	781	56.7	1600	53.2
The place where malaria mosquito bite						
Inside the house	571	35.0	662	48.1	1233	41.0
Outside the house	136	8.3	0	0.0	136	4.5
Inside and outside of the house	925	56.7	715	51.9	1640	54.5
Know the place of mosquito breeding						
Yes	1410	86.4	397	28.8	1807	60.1
No	222	13.6	980	71.2	1202	39.9
Know the symptoms/signs of malaria						
Yes	1208	74.0	464	33.7	1672	55.6
No	424	26.0	913	66.3	1337	44.4
Know how to treat the malaria						
Yes	955	58.5	264	19.2	1219	40.5
No	677	41.5	1113	80.8	1790	59.5
Know that they can be infected by malaria						
Yes	1315	80.6	1179	85.6	2494	82.9
No	317	19.4	198	14.4	515	17.1
Know that malaria is a dangerous disease						
Yes	1585	97.1	1231	89.4	2816	93.6
No	47	2.9	146	10.6	193	6.4

Activities outside

Table 3 showed habitual activities outside of respondent above 12 years-old.

More than 50%, respondent above 12 years-old was active outside including farmer and fisherman.

Table 3. Habitual of activities outside of respondent (≥ 12 years) in South Halmahera, 2012

Variables	West Gane		East Gane		Total	
	n	%	n	%	N	%
Working as a fisherman, farmer of shrim/fish embankment, plantation or in forest	(n=1351)		(n=1482)		(n=2833)	
Yes	667	49.4	993	67.0	1660	58.6
No	684	50.6	489	33.0	1173	41.4
Ever gone to the sea in the night, spend the night in the embankment, garden or forest						
Yes	93	6.9	84	5.7	177	6.3
No	1258	93.1	1398	94.3	2656	93.7
Like to assemble or chat outside in the night						
Yes	480	35.5	1286	86.8	1766	62.3
No	871	64.5	196	13.2	1067	37.7

In addition, 6.9 % in West Gane and 5.7% in East Gane have ever gone to the sea in the night; spend the night in the embankment, garden or forest. However, many respondents (35.5% and 86.8%

respectively in West Gane and East Gane) like to assemble or chat outside in the night.

Preventive action at household level

Table 4 showed using mosquito net and other preventive actions of household. In West Gane, around 55% and 45% of

households in West Gane and East Gane respectively had mosquito net in their house.

Mostly they got the net from government (89.0%).

Table 4 .Using mosquito net and preventive action for malaria in South Halmahera, 2012

Variables	West Gane		East Gane		Total	
	n	%	n	%	n	%
Have mosquito net in house	(n=405)		(n=405)		(n=810)	
Yes	221	54.5	176	43.4	397	49.0
No	184	45.5	229	56.6	413	51.0
How to get the net	(n=221)		(n=176)		(n=397)	
Bought	25	11.5	4	2.2	29	7.3
Given by family	3	1.2	0	0.0	3	0.7
Given by government	189	85.5	164	93.5	353	89.0
Given by private	3	1.2	0	0.0	3	0.7
Others	1	0.6	8	4.3	9	2.3
Frequencies of net using	(n=221)		(n=176)		(n=397)	
Every night	110	49.7	142	80.4	252	63.5
Sometimes	54	24.3	34	19.6	88	22.2
Never	57	26.0	0	0.0	57	14.3
Consume the prevention medicine of malaria in last three month	(n=1351)		(n=1482)		(n=2833)	
Yes	145	10.7	28	1.9	173	6.1
No	1206	89.3	1454	98.1	2660	93.9
Using the repellent in last three month	(n=1351)		(n=1482)		(n=2833)	
Every night	38	2.8	13	0.9	51	1.8
Sometimes	59	4.4	42	2.8	101	3.6
Never	1254	92.8	1427	96.3	2681	94.6
Using burned anti mosquito on the night in last three month	(n=1351)		(n=1482)		(n=2833)	
Every night	586	43.4	28	1.9	614	21.7
Sometimes	289	21.4	1119	75.5	1408	49.7
Never	476	35.2	335	22.6	811	28.6
Cover the opened body part when go out in the night	(n=1351)		(n=1482)		(n=2833)	
Every night	905	67.0	448	30.2	1353	47.8
Sometimes	412	30.5	139	9.4	551	19.4
Never	34	2.5	895	60.4	929	32.8

However, only 49.7% in West Gane and 80.4% in East Gane used it every night. Furthermore, some prevention actions such as repellent was rarely used but mosquito coil was sometimes used by around 21 and 75% in West Gane and East Gane respectively. In addition, more than half of household member in West Gane (67%) covered the open body every night when go out in the night while only 30% did the same things in East Gane.

DISCUSSION

This study explored villagers knowledge, perception, and practice about the cause, treatment, and prevention of malaria and their activities related to the control of the disease. Our results described that knowledge, practice, and behavior on

malaria in both study areas was different especially for the symptom/sign and how malaria was treated as well as some prevention actions. The study result showed that many of the respondents were illiteracy. Illiteracy had a profound influence on their perception of cause and treatment seeking behavior for malaria. [8] Most of respondents have heard about malaria but majority of them did not know the cause of malaria. Another study [9] showed that poverty and level of schooling were found as important determinants of malaria knowledge and practices. The study found significant differences between completed years of schooling and several knowledge indicators in their study areas. Similarly, they found significant differences between household asset quintiles and the knowledge indicators.

Though formal education has been discussed as a possible explanation of a better knowledge about the cause of malaria, [10] it seems not to be the case given the low educational level in this population.

The recognition of signs and symptoms of malaria was low in this study. Beside that only 40.5% of respondents know how to treat the malaria. However, majority respondents considered that malaria is the fatal disease and most of them know that they can be infected by malaria. This study is different from a study in Guyana [11] where they found 96% of the population used official health care sectors for malaria treatment. In this study, they found good level of knowledge of malaria which may due to the relatively high literacy rate and level of education in Guyana. In addition, public clinics in Guyana provide treatment and anti malaria drugs at no cost.

Only about 45.5% respondents replied that mosquito bite is the cause of malaria transmission. This is consistent with findings from other studies that show that if people do not perceive the mosquito to be responsible for malaria transmission they do not take significant measures to protect themselves against the vector. [12-13] Importantly, previous studies have shown that knowledge about the malaria vector reduce the risk of infection. [14] As compared to knowledge on disease transmitted by the mosquito, the knowledge on breeding place of mosquito is higher (86.4%). This is related to controlling malaria program by health centers which educate the community to eliminate stagnant water surrounding their houses.

Most of the households (54.5%) had a bed net which had been distributed by the government. Yet, only 49.7% of respondents use the bed net every night. Similar low level of knowledge on preventive use of bed net had been observed in Ethiopia, [15] Iran, [16] Delhi, India, [17] Turkey, [18] and Haiti.

[19] This is an issue where the local malaria control program should concentrate more on this effort. This study also found that insecticide net did not use by community consistently. Warm temperature in Halmahera Selatan and they do not feel good of using the insecticide net became some reasons for it. As found by another study. [20] However, people understand that they should away from mosquito at night. That is why some of household has another prevention action by using anti mosquito stuff. They believe that it could work to prevent malaria disease.

CONCLUSION

This study showed that limited of knowledge, practice, and behavior of malaria in the study is related to lack of education and socioeconomic status of community in study areas especially in East Gane. At some extent, some community members have known some aspect of prevention actions due to government activities in controlling malaria infection. Therefore, health education in the community may be a more effective way to disseminate health information as shown in some studies. [21-22] We may recommend that health education materials oriented towards increasing the knowledge and practice to prevent and control malaria infection should be developed in study areas.

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