RESEARCH ARTICLE
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The Influence of Community Efforts on Malaria Vector Density

Hilarius Yosef Muda Gudipung*, R. Azizah*
*Department of Environmental Health, Faculty of Public Health, Airlangga University, Indonesia
Email: igudipung11@gmail.com

ABSTRACT

Malaria still becomes a public health problem, especially on the outside of Java and Bali. Increasing morbidity rate of malaria is one thing caused by malaria vector that exist in endemic area. This study aimed to study the incidence of malaria cases and the effect of community efforts on malaria vectors density, using the cross sectional design. Subjects were 92 people in endemic and non-endemic villages. The variables were vector density as dependent variable, while mosquito repellent, mosquito breeding sites cleaning, spray mosquito coil as independent variable. Data was analyzed using logistic regression test. The p-value and OR of mosquito repellents were 0.077 and 2.304, p-value and OR of breeding place cleaning were 0.028 and 2.741, while p-value and OR of spray mosquito were 0.006 and 3.799. Health education activities about malaria disease still need to be improved, to avoid mosquito bites should be understood how to control the mosquito, so mosquito density can be reduced. It is expected that the community participates in the prevention of malaria in their area.

Keywords: Malaria, Mosquito, Vector density

INTRODUCTION

Background

One of the vector-borne diseases is malaria. Malaria is caused by plasmodium (Sillehu et al. 2016a; Sillehu et al. 2016b) through the bite of a female Anopheles. In Indonesia there are 12 species of Anopheles mosquitoes such as *Anopheles Maculatus* which is the main vector in Bali, *Anopheles Sundaicus* which is the main vector in Sumatera, *Anopheles Punctuluctus* in Maluku and *Anopheles Aconitus* in NTB. Until now malaria is a public health problem in Java and outside Java (Haryanto, 2000).

The prevention efforts have not succeeded in finding significant morbidity, even in the last five years there has been an increase cases in various regions. Various restrictive measures to reduce morbidity and mortality rate have been done. In 2010 the efforts of eradicating malaria simultaneously by distributing insecticide treated bed nets but the results have not been encouraging. In addition to malaria eradication too emphasize on one insecticide spraying technology that proved unable to cope malaria, it is due to the efforts to eradicate malaria less consider political, social, economic and cultural factors of the affected community though (Kemenkes RI, 2009).

This activity is undertaken in eradication of malaria intended to break the transmission one or more host, agent, and environment that essentially intended for the eradication of vector and the discovery of treatment of the patients. Based on data from East Lombok Health Office, there is endemic malaria in every sub-district. Particularly Pringgabaya sub-district consists of 10 villages on average cases of malaria. The number of malaria cases of AMI (Annual Malaria Incident) from year to year is fluctuated. It also affects the case of API (annual Parasite incidence) malaria. From 2008 - 2010 there was a decrease in API cases.

Purpose

Based on data from the monthly report of malaria findings and treatment of Pringgabaya Health Office it is known that the number of malaria incidents or Annual Parasite Incidence (API) for 2008 amounted to 27.4 per 1,000 population, in 2009 of 10.2 per 1,000 population and in 2010 amounted to 2.8 per 1,000 population. The cases were decreased but still far from the national rate (<1/1000 pdkk). This research aimed to study the incidence of malaria cases and the effect of community efforts on malaria vectors density.

METHODS

The type of research conducted was descriptive analytics that aims to describe and find the relationship between variables. This study used a cross sectional study that is an epidemiological study design conducted at a certain time by observing once of each subject to describe the current state. The population in this study is the community in the village of Labuhan Lombok and Pohgading Village Pringgabaya sub-district East Lombok of NTB. The sample in this study was the head of the family in the village area of Labuhan Lombok and Pohgading village, Pringgabaya sub-district, East Lombok regency of NTB (if in one house found more than one head of house will be considered one family head, or can be replaced with children aged 15 years or more) 92 samples. The sampling technique in this research use random sampling that is Systematic Random Sampling that is population divided by amount of sample. The result is an interval which is then used to determine the sample to be taken.

RESULTS

Table 1. Distribution of mosquito repellent usage effect on vector density

Mosquito Repellent Usage	Vector Density				Total		P Value	OR (95% CI LL-UL)
	Yes		No					
	n	%	n	%	n	%		
Yes	15	16.50	20	21.80	35	38.30	0.011	3.047 (1.285-7.222)
No	42	45.20	15	16.50	57	61.70		
Total	57	61.70	35	38.30	92	100.00		

The result of logistic regression test showed that there was an effect of mosquito repellent usage on vector density and the qualified for inclusion into multivariate analysis because p = 0.011 (p<0.25) with OR = 3.047 (95% Cl 1.285-7.222), this indicated that the risks of mosquito repellent usage at 3.047 times against the low vector density.

Tabel 2. Distribution of breeding site cleaning effect on vector density

Breeding Site Cleaning	Vector Density				Total		P Value	OR (95% CI LL-UL)
	Yes		No					
	n	%	n	%	n	%		
Yes	18	19.80	22	24.20	40	44.00	0.014	2.946 (1.249-6.950)
No	22	23.00	30	33.00	52	56.00		
Total	40	42.80	52	57.20	92	100.00		

The result of logistic regression test showed that there was influence of mosquito breeding site cleaning on vector density and it was qualified for inclusion into multivariate analysis, because p = 0.014 (p <0.25) with OR = 2.946 (95% Cl 1.249-6.950), it showed that mosquito breeding site cleaning was at risk of 2.946 times against low vector density.

Tabel 3. Distribution of mosquito repellent spray usage effect on vector density

Mosquito Repellent Spray Usage	Vector Density				Total		P Value	OR (95% CI LL-UL)
	Yes		No					
	n	%	n	%	n	%		
Yes	17	18.70	10	11.00	27	29.70	0.003	4.039 (1.589-10.262)
No	28	30.80	37	39.50	65	70.30		
Total	45	49.50	47	50.50	92	100.00		

The result of logistic regression test showed that there was influence of spray mosquito repellent on vector density and it was qualified to be included in multivariate analysis, because p = 0.003 (p<0.25) with OR = 4.039 (95% Cl 1.589-10.262), this showed that mosquito spray was at risk of 4.039 times to low vector density.

Table 4. The results of logistic regression test

Variable	B	Sig	Exp (β)	95 % Cl for Exp (β)	
				Lower	Upper
Mosquito repellent	0.835	0.077	2.304	0.913	5.015
Breeding site cleaning	1.008	0.028	2.741	1.117	6.724
Mosquito repellent spray	1.335	0.006	3.799	1.458	9.899

The result of logistic regression test showed that: 1) there was no effect of mosquito repellent usage on vector density, because p = 0.77 (p> 0.05) with OR was not significant, since it passed number 1 and more than one; 2) there was effect of mosquito breeding cleaning on vector density because p = 0.028 (p <0.05) with OR 2,74 (95% Cl 1.117-6.724), this indicated that clearance of mosquito breeding site was at risk 2.741 times to low vector; 3) there was effect of mosquito spray on vector density because p = 0.006 with OR was 3.799 (95% Cl 1.458-9.889), it showed that spray mosquito spray usage was 3.799 times to low density.

DISCUSSION

The Influence of Mosquito Repellent Usage Towards Vector Density

There was no effect of mosquito repellent usage on vector density. This is appropriate with the assertion that a deficiency of mosquito repellent can cause irritation in an allergic person (Kemenkes RI, 2012). According to Haryanto (2010), the habit of being outdoors late at night, where the vector is exophagic will facilitate mosquito bites, therefore raising public awareness about the dangers of malaria should be undertaken by affecting people's awareness to eradicate malaria by setting the mosquito netting, and using mosquito lotion.

The influence of mosquito breeding site cleaning towards vector density

There was effect of mosquito breeding cleaning on vector density. So this shows that mosquito breeding is 2.741 times of low vector density. According Soedarto (2009), one way to break the life cycle of mosquitoes (negate the breeding site) at least once a week. This is due to the life cycle of *Anopheles* from larva to adult takes 11 to 17 days with details of eggs to be larva is 1 to 2 days, pupa 8 to 12 days and adults 2 to 3 days.

The influence of mosquito repellent spray towards vector density

There was effect of mosquito spray on vector density. This shows that the use of spray mosquitoes 4.039 times against low density. This is in accordance with the statement of one of the purposes for using spray mosquito repellent is to kill adult mosquitoes with an average daily death of 40 to 60% for potential vector (Kemenkes RI, 2012).

CONCLUSION

The determinants of malaria vector density in Labuan Lombok Village and Pohgading Village, Pringgabaya Sub-distrcit, East Lombok District, NTB, Indonesia are spray mosquito repellent and mosquito breeding site cleaning.

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