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Research Article

RISK FACTORS FILARIASIS INCIDENT BY GEOGRAPHIC INFORMATION SYSTEMS APPROACH IN PASAMAN BARAT PROVINCE OF WEST SUMATERA

1,*MasrizalDt Mangguang, 2HariKusnanto, 3LuthanLazuardi

¹Public Health Faculty, Andalas University, Indonesia

²Field Epidemiology Training Program (FETP), Medical Faculty Gadjah Mada University Mada, Indonesia

³Health Information System, Medical Faculty Gadjah Mada University, Indonesia

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ABSTRACT

Objective:

To determine the risk factors that related to filariasis incidence and also to give mapping of distribution of filariasis incidence at Pasaman Barat 2014.

Methods:

This research uses is case control study design. Samples consisted of 38 cases and 38 controls. The data were analyzed by using univariate, bivariate by using McNemar test, and multivariate.

Results:

The result showed that a risk factor is use of mosquito nets (OR =2, 67, 95% CI: 1.04-6.81), the habit of dressing (OR =3.50, 95% CI: 1.15-10.63), the marshes (OR =11, 95% CI: 1.42-85, 20), the ceiling of the house (OR =3.67, 95% CI: 1.02-13.14). Risk factor had no significant correlation is knowledge level, education level, ethnicity, wire netting, the habit of evening out, anti mosquito, animal reservoirs, plantation, rice fields, river, beach and bush. The highest spatial distribution of filariasis incidence are in the Sungai Aur.

Conclusion:

Spatial distribution of filariasis incidence is in the area of oil palm plantations, swamps, river sand rice fields. The most dominant risk factor was ceiling of the house. It is recommended to people to use mosquito nets during sleeping and wear clothing that protects the entire body from mosquito bites. Implement improvement and extension of the filariasis vector control programs and the types of mosquitoes in an integrated environment.

INTRODUCTION

Filariasis is caused by filarial worms are transmitted by various species of mosquitoes. Worm species cause Filariasis is: *Wuchereria bancrofti*; *Brugia malayi*; *Brugia timori*. All of these species are found in Indonesia, but more than 70% of cases of filariasis in Indonesia caused by *Brugia malayi*. Acute symptoms of filariasis is an inflammation of lymph in glands and duct (*adenolymphangitis*) especially in the groin and armpits. Symptoms of chronic filariasis caused by blockage of lymph flow, especially in the same area with inflammation and cause symptoms such as elephantiasis (elephantiasis). This disease causes the sufferer unable to work optimally even dependent on others so that a burden on the family, community, and state (Wahyono TYM, 2010). Indonesia is a country that categorized of endemic filariasis.

*Corresponding author: MasrizalDt Mangguang,
Public Health Faculty, Andalas University, Indonesia.

Filariasis spread almost in all parts of Indonesia, especially eastern Indonesia which have a higher prevalence. From year to year the number of reported cases of filariasis province continues to grow. According to the Directorate General of Disease Control and Environmental Health, Department of Health, Republic of Indonesia that the number of cases of filariasis in 2000 was 6,233 cases, but there was a rapid increase in 2009 as many as 11 914 cases. While the number of occurrences of filariasis in Indonesia in 2010, 2011, 2012 each of which is 11 969, 12 066 and 11 903 cases (Wahyono, 2010, Supriyantoro, 2013a). Distribution spread of filariasis cases in Indonesia covering almost all provinces, including the province of West Sumatra. West Sumatra province is an area endemic filariasis and has ranked eleventh most cases of filariasis in 2013 that 225 cases were scattered in various districts and cities. Pasaman Barat have number of cases of filariasis in 49 cases with the highest prevalence of filariasis in West Sumatra Province is 12.40 in 2013 (Supriyantoro, 2013b, DKK Pasaman

Barat, 2014). Health Department Pasaman Barat perform mass medical treatment of filariasis in 2007. But in fact mass medical treatment is done not work well. This can be evidenced by the results of filariasis mass treatment evaluation conducted on 15 randomly selected elementary schools in 2013. The results of blood tests were conducted to 500 primary school children in Pasaman Barat are 63 of them were positive microfilariae. From the results of this evaluation is obtained the numbers of Microfilaria Rate (Mf-Rate) in Pasaman Barat by 12.6%. This number certainly exceeds the standard rate of microfilaria (Mf-Rate) which has been set by the WHO to determine an area endemic filariasis is $> 1\%$. Failure mass medical treatment can be caused by habits and behavior of people who are still at risk for contracting the disease filariasis, and it is not certain point coordinates residence filariasis patients. Thus the need to know the behavior of the population, the type of mosquito, the coordinates of a place to stay patient to accelerate the success of filariasis elimination program in Pasaman Barat (Dinas Kesehatan Kabupaten Pasaman Barat, 2013a).

There are some people's behavior can be found, among others, some local decision-makers have not realized that the economic losses due to filariasis mass treatment has not prioritize activities that result in operating costs is not or is not adequate, the notion some people that the disease is caused by a curse to order or so do not need to be treated by health workers but people turn to traditional healers, lack of community participation during the examination and blood sampling at night, side effects of treatment cause people do not want to continue treatment until complete, lack of community participation in preventing filariasis such a way to avoid yourself from mosquito bites, eliminating mosquito breeding places and went to health centers when there are signs of filariasis, a distance away from people's homes to go to community health centers that require transportation costs are quite expensive. (Departemen Kesehatan Republik Indonesia Direktorat Jendral PP & PL, 2009, Dinas Kesehatan Kabupaten Pasaman Barat, 2013b).

Pasaman Barat located between $00^{\circ} 33'$ north latitude to $00^{\circ} 11'$ south latitude and $99^{\circ} 10'$ to $100^{\circ} 04'$ east longitude which has an area of 3864.02 km². In general topography of Pasaman Barat is flat and slightly undulating, while the hills and mountainous areas in Sub-district are only Talamau and Gunung Tuleh. Altitude area varies from 0 to 913 meters above sea level. Flat area with a slope of 0-3%, flat with a slope of 3-8% wavy, curly and wavy with a slope of 8% -15% and the mountainous region of the hill slope above 15%. Pasaman Barat Territory there are many beaches, marshes, plantations, rice fields, rivers, puddles, forests, bushes. The population of Pasaman Barat in 2013 as many as 395 098 people spread in eleven subdistricts. (Dinas Kesehatan Kabupaten Pasaman Barat, 2013b, Budi, 2011).

Pasaman Barat is a favorite destination national and local transmigration once before separated from its mother district by Law No.38 of 2003 dated 18 December 2003. This causes the diversity of the people of Pasaman Barat is composed of indigenous people (Malay, Minang, Mandailing) and migrant communities (Java). (Budi, 2011). Economy contribution of Pasaman Barat of the agricultural sector is dominated by food crops and oil palm plantations.

So livelihoods of Pasaman Barat majority of farmers in addition to fishermen, driver, trade, private sector employees, civil servants. Besides, the community of Pasaman Barat have some population patterns are watching television and sitting together in the cafes, sleep in the fields, fishing and hunting at night. (Budi, 2011, Dinas Kesehatan Kabupaten Pasaman Barat, 2013b). There are many risk factors that could cause filariasis. These factors can be derived host (host / human), agent (filaria worms) and the environment (environment). One of the trigger factor derived from the host that is a habit out of the house at night. Environmental factors are also a risk factor for the work and activities of individuals who can not be separated from their interaction with the surrounding environment (Depkes RI Dirjen PP & PL, 2009a).

Mapping the spread of the disease is important in particular epidemiological mapping the spread of infectious diseases and infectious diseases. By using spatial analysis not only know the distribution pattern of the disease, high-risk regions and regional disease risk factors but for the discovery of the cause or source of disease transmission so that efforts to control the disease and the termination of the chain can be done properly. But at this point of spatial analysis in particular filariasis research has not been done in Indonesia. Distribution where the location is definitely the place to stay patient and the patterns of spread of filariasis in Pasaman Barat not known with certainty (Depkes RI Dirjen PP & PL, 2009b). Based on this background the authors are interested to further investigate risk factors of filariasis using Spatial Analysis (Geographic Information System) in Pasaman Barat 2014. It is expected that this study can be seen with the intervention and appropriate measures for decision-making, break the chain of transmission, and control of filariasis

MATERIALS AND METHODS

This research is quantitative research using case control study research design, using Geographic Information System approach (GIS). This study was conducted from January to July 2014. The research is in Pasaman Barat. The population of cases in this study is a good filariasis patients who have shown clinical symptoms or who have been found microfilariae in the peripheral blood examination based on records at the Department of Health report. During the period of the year 2013 in Pasaman Barat found 38 events filariasis. Population control in this study are those who are not suffering from filariasis and do not live at home with the case. The number of the control group were taken is the ratio of 1: 1, in which one person from each group then the case will be resolved one as a control group of respondents. The selection of respondents to the control using matching age and gender are still being within the case. Determination of sample size in this study using case-control pairs formula obtained a sample of at least as many as 34 people. Because the number of small population that is 38 persons, all members of the population are taken for examination in this study. Data Analysis, Univariate analysis is used to obtain a frequency distribution of individual risk factor variables (knowledge, education, ethnicity (native / immigrants), the use of wire netting, a habit out at night, the use of mosquito nets, use mosquito repellent, dressing habits, habit of keeping animals reservoir) and variable environmental risk factors (where the plantation, rice fields, rivers, marshes, beaches, bushes, and home ceiling).

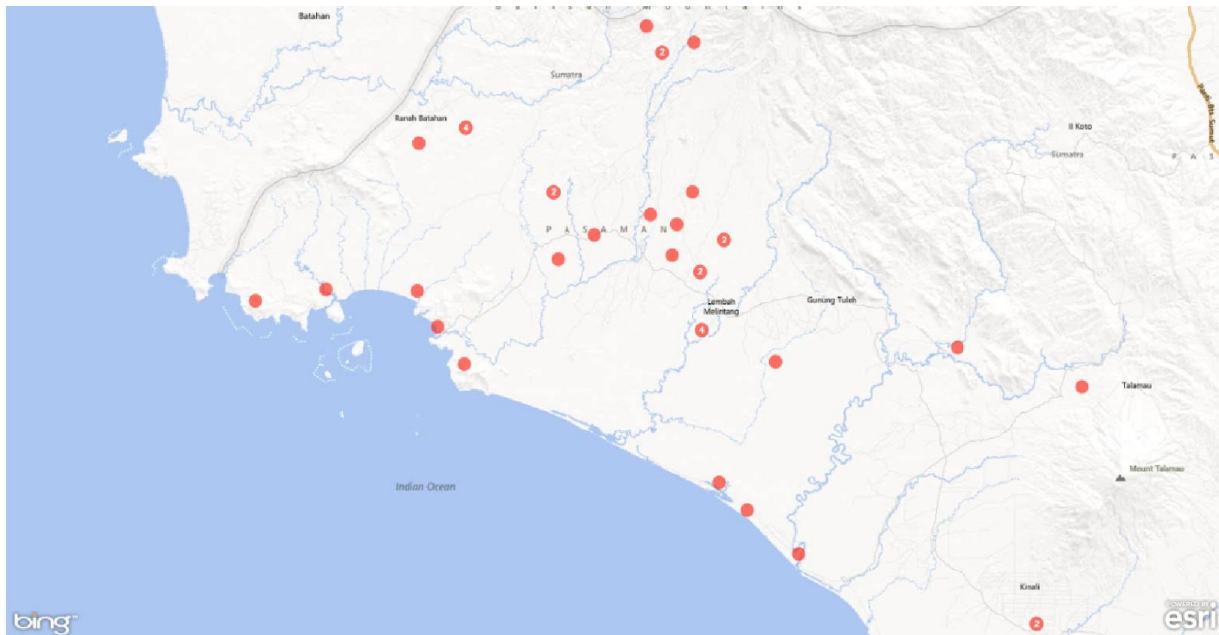


Image.1 Distribution of Filariasis in Pasaman Barat District 2014

Bivariate analysis is used to examine the relationship between the two variables of individual risk factors and variable environmental risk factors with the incidence of filariasis. The test that will be used is the McNemar statistical test and Chi Square Test with a degree of confidence of 95% ($\alpha = 0.05$). McNemar test is used if the value of OR in different McNemar test with OR on Chi Square Test. Chi Square test is used when the value of McNemar OR on the same test with OR on Chi Square. The relationship is said to significant when the p value < 0.05 and see the value Odds Ratio (OR) to estimate the risk level of each variable were investigated. (Bhisma, 1997). Multivariate analyzes were performed to examine the relationship between independent variables and the dependent variable and the independent variables which determine the most dominant relationship to the dependent variable. All independent variables (knowledge, education, ethnicity (native / immigrants), the use of wire netting, a habit out at night, the use of mosquito nets, use mosquito repellent, dressing habits, habits of animals maintain the reservoir, where the plantation, where rice fields, where the river, where marshes, beaches, bushes, and home ceiling) is connected with the occurrence of filariasis by using Epi Info 7 applications to see which are the most dominant variable using conditional logistic regression backward method L / R. Spatial analysis using EpiInfo software 7 to determine the distribution and location of filariasis patients aware of any groupings or clusters of cases and control of filariasis in regional analysis.

RESULTS

The research found that individual risk factors associated with the incidence of filariasis is the use of mosquito nets (OR = 2.67, 95% CI: 1.04 to 6.81) and dressing habits (OR = 3.50, 95% CI: 1, 15 to 10.63), while those not associated with the incidence of filariasis is the level of knowledge (OR = 1.09, 95% CI: 0.48 to 2.47), educational level (OR = 3, 95% CI: 0, 31 to 28.84), ethnicity (OR = 3, 95% CI: 0.31 to 28.84), wire netting (OR = 1.5, 95% CI: 0.25 to 8.98), habit out the night (OR = 1, 95% CI: 0.33 to 3.01), anti-mosquito (OR = 1.13, 95% CI: 0.43 to 2.94)

and animal reservoir (OR = 1, 18, 95% CI: 0.53 to Environmental risk factors associated with the incidence of filariasis is the existence of a swamp (OR = 11, 95% CI: 1.42 to 85.20) and the ceiling of the house (OR = 3.67, 95% CI: 1.02 to 13.14) while that is not associated with the incidence of filariasis is where plantation (OR = 3, 95% CI: 0.31 to 28.84), paddy (OR = 2, 95% CI: 0.18 to 22.06), river (OR = 1.33, 95% CI: 0.30 to 5.96), beach (OR = 2, 95% CI: 0.18 to 22.16), bush .belukar (OR = 3, 95% CI : 0.31 to 28.84) there is no significant relationship with the occurrence of filariasis. The dominant risk factors that affect the incidence of filariasis is the ceiling of the house with a pValue=0,021 (OR =5,12, 95% CI: 1,279-20,470)

DISCUSSION

Statistical test results obtained p-value > 0.05 ($p = 0.0835$), which means there is no significant relationship between the knowledge of the incidence of filariasis in Pasaman Barat 2014. There is aligned with the research conducted by Jontari (2008) in the District Agam West Sumatra province found that respondents with low knowledge of 2.87 times more at risk than those having high knowledge and has a significant relationship. Knowledge plays an important role in shaping a person's behavior, including behavior in an effort to identify, prevent and eradicate filariasis. Low knowledge led individuals or families is difficult to identify the disease, the cause of the disease and efforts to prevent and eradicate filariasis.

As a result, the risk of getting the disease filariasis higher compared with individuals or families who have a good knowledge (Jontari, 2014). Statistical test results obtained p-value > 0.05 ($p = 0.375$), which means there is no significant relationship between level of education and the incidence of filariasis. In harmony with the research conducted by Uloli R (2008) in the district of Gorontalo Province Bonebolango found that there was no significant relationship between low education levels with the incidence of filariasis, education is an important factor in increasing community awareness and knowledge of health in particular insight.

Table1. Relationship between Independent Variable and Dependent Variable using *chi-square test*

No	Variable	Cases		Controls		Total		OR (95% CI)	pValue
		f	%	f	%	f	%		
1	Habit of Out Tonight	30	78.95	30	78.95	60	78.95	1,00 (0,33-3,11)	1,00
	Out Tonight	8	21.05	8	21.05	16	21.05		
	Not Out Tonight	8	21.05	8	21.05	16	21.05		
2	Repelent Using	13	34.21	12	31.58	25	32.89	1,13 (0,43-2,94)	0,81
	Use	25	65.79	26	68.42	51	67.11		
	Do not Use	25	65.79	26	68.42	51	67.11		
	Total	38	100	38	100	76	100		

Table 3. Relationship of Independent Variables with Dependent Variable Using *McNemar Test*

No.	Cases	Control						OR (95% CI)	pValue
		At Risk		Not At Risk		Total			
		f	%	f	%	f	%		
1	Knowledge							1,09 (0,48-2,47)	0.84
	At Risk	8	42,11	12	63,16	20	52,63		
	not at risk	11	57,89	7	36,84	18	47,37		
	Total	18	100	19	100	38	100		
2	Pendidikan							3,00 (0,31-28,84)	0.375
	At Risk	34	97,14	3	100	37	97,37		
	not at risk	1	2,86	0	0	1	2,63		
	Total	35	100	3	100	38	100		
3	Ethnicity							3,00 (0,31-28,84)	0.375
	At Risk	4	80,00	3	9,09	7	18,42		
	not at risk	1	20,00	30	90,91	31	81,58		
	Total	5	100	33	100	38	100		
4	wire netting							1,5 (0,25-8,98)	0.688
	At Risk	33	94,29	3	100	36	94,74		
	not at risk	2	5,71	0	0,00	2	5,26		
	Total	35	100	3	100	38	100		
5	UsingMosquito nets							2,667 (1,04-6,81)	0.033*
	At Risk	11	64,71	16	76,19	27	71,05		
	not at risk	6	35,29	5	23,81	11	28,95		
	Total	17	100	21	100	38	100		
6	Dressing habits							3,50 (1,15-10,63)	0.019*
	At Risk	14	77,78	14	70,00	28	73,68		
	not at risk	4	22,22	6	30,00	10	26,32		
	Total	18	100	20	100	38	100		
7	Reservoir Maintain							1,18 (0,53-2,64)	0.683
	At Risk	8	42,11	13	68,42	21	55,26		
	not at risk	11	57,89	6	31,58	17	44,74		
	Total	19	100	19	100	38	100		
8	The existence of Plantation							3,00 (0,31-28,84)	0.375
	At Risk	19	95,00	3	16,67	22	57,89		
	not at risk	1	5,00	15	83,33	16	42,11		
	Total	20	100	18	100	38	100		
9	The existence of Rice Field							2,00 (0,18-22,06)	0.625
	At Risk	8	88,89	2	6,90	10	26,32		
	not at risk	1	11,11	27	93,10	28	73,68		
	Total	9	100	29	100	38	100		

Based on the results showed that the majority of respondents only school to elementary school or not. This happens because of their low economic status that does not have a fee to continue to higher education(Reyke Uloli, 2008). Statistical test results obtained p-value> 0.05 (p = 0.375), which means there is no significant relationship between the tribes with the incidence of filariasis. In harmony with the research conducted by Santoso (2011) in Muaro Jambi found that there was no significant relationship between low education levels with the incidence of filariasis. Migrants in a filariasis endemic areas have a greater risk of becoming infected filariasis compared with natives. Migrants from non-endemic areas to endemic areas, such as transmigration, although the blood test has not or little finger containing microfilariae (Santoso, 2008).

Hasil uji statistik diperoleh nilai *p-value* > 0,05 (p = 0.688), yang berarti tidak terdapat hubungan yang bermakna antara pemakaiankawatkasa dengan kejadian Statistical test results obtained p-value> 0.05 (p = 0688), which means there is no significant relationship between the use of wire netting with the incidence of filariasis. These results are in contrast to studies Praise Juriastuti et al (2010) in the village Jati Sampurna of Bekasi City got the result that the respondents who do not use wire netting 7.2 times more likely than respondents who wore wire netting, wire netting signifikan.Penggunaan relationship is very important in reducing contact between respondents with mosquitoes as vectors of filariasis.Observed during the study looks more than half of the respondents to the case do not use a wire gauze in his home. This certainly increases the risk of incidence of filariasis.

No	Cases	Control						OR (95% CI)	pValue
		At Risk		Not At Risk		Total			
		f	%	f	%	f	%		
10	The existence of the River								
	At Risk	22	88,00	4	30,77	26	68,42	1,33(0,30-5,96)	0,727
	not at risk	3	12,00	9	69,28	12	31,58		
	Total	25	100	13	100	38	100		
11	The existence of Marshes							11,00 (1,42-85,20)	0.003*
	At Risk	10	90,91	11	40,74	21	55,26		
	not at risk	1	9,09	16	59,26	17	44,74		
	Total	11	100	27	100	38	100		
12	The existence of beach							2,00 (0,18-22,05)	0.625
	At Risk	6	85,71	2	6,45	8	21,05		
	not at risk	1	14,29	29	93,55	30	78,95		
	Total	7	100	31	100	38	100		
13	The existence of the thicket							3.00 (0,31-28,84)	0,375
	At Risk	20	95,24	3	17,65	23	60,53		
	not at risk	1	4,76	14	82,35	15	39,47		
	Total	21	100	17	100	38	100		
14	Homeceiling							3,67(1,02-13,14)	0,035*
	At Risk	23	88,46	11	91,67	34	89,47		
	not at risk	3	11,54	1	8,33	4	10,53		
	Total	26	100	12	100	38	100		

Table 4. Dominant Variable Affecting of filariasis in Pasaman Barat 2014

Variable	OR	95 % CI	Coefficient	SE	pValue
Mosquito nets	3,13	1,084-9,034	1,1407	0,5410	0,035*
Marshes	2,95	1,027-8,453	1,0806	0,5377	0,0445*
Home Ceilling	5,12	1,279-20,470	1,6325	0,7074	0,021*
Dressing Habbit	2,63	0,903-7,643	0,9659	0,5449	0,0763

Community unreasonable to not use a wire netting for no cost. Although people do not use a wire netting at home but they still use insect repellent and mosquito nets to prevent mosquito bites. This resulted in the absence of a significant association between the use of wire netting with the incidence of filariasis (Juriastuti et al., 2010). Statistical test results obtained $p\text{-value} > 0.05$ ($p = 1.00$), which means there is no significant relationship between the habit of a night out with the incidence of filariasis. Results are in line with research conducted by Juriastuti P in Sub Jati Sampurna found that respondents who have a habit out night 5.429 times more at risk than those not accustomed to go out at night and have relationships that are periodic nocturnal signifikan. Mikrofilaria (microfilariae only in in the peripheral blood at night) have the vector are actively looking for blood at night, so that the risks of transmission is very high when someone came out at night. In areas with microfilariae sub periodic and non-periodic nocturnal, transmission can occur both day and night (Juriastuti et al., 2010). Habits of the people who often go out night increases the risk for someone to hit filariasis. Conditions of respondents region is still high sense of family causes people often socialize. Out night for socialization as sitting in a stall or watch together has become commonplace for msayarakat in the study area Based on the results obtained by statistical test $p\text{ value} < 0.05$ ($p = 0.0330$), meaning that there is a significant relationship between the use of mosquito nets when sleeping with the incidence of filariasis. Obtained from statistical calculations $OR = 2.667$ (95% CI: 1.044 to 6.814) means that respondents who did not use mosquito nets when sleeping 2.667 times the risk for filariasis compared to those using mosquito nets while sleeping and the use of mosquito nets while sleeping is a risk factor for the incidence of filariasis.

Results are similar to the research conducted by Reyke Uloli (2008) in the district of Gorontalo Province Bonebolango found that respondents who did not use mosquito nets bedtime 11.5 times more risky than using mosquito nets while sleeping and had a significant relationship. The use of mosquito nets is an attempt to prevent contact with mosquitoes. nets of any kind used by the respondent at the time of sleep, remain a significant effort in order to prevent the transmission of filariasis, but the use of mosquito nets would be meaningless if it is not followed by the routine use by someone. (Jontari, 2008)The results of the field to interview the respondents generally do not use mosquito nets when sleeping. This is because the condition of Pasaman Barat hot enough so that the respondents are reluctant to use a mosquito net while sleeping. Another reason is that most of the respondents are already using anti-mosquito so feel no need anymore to use mosquito nets when sleeping (Reyke Uloli, 2008).

Statistical test results obtained value of $p > 0.05$ ($p = 0.808$), which means there is no significant relationship between the habit of wearing mosquito repellent with the incidence of filariasis. The results of this study differ from research conducted by Nasrin (2008) in West Bangka Regency with cross sectional design. It was found that respondents who have a habit of not taking anti mosquito 5.063 times more risky than having the habit of wearing mosquito repellent and has a significant relationship. Use mosquito repellent is one method that is often used by people to prevent mosquito bites. The use of the tools that are simple, such as mosquito coils, topical, spray or electricity. The results showed still a bit of respondents use insect repellent for protection against mosquito bites (Nasrin, 2008).

Based on the results obtained by statistical test p value < 0.05 ($p = 0.0192$), meaning that there is a significant correlation between the incidence of filariasis dressing habits. Statistical calculations derived from $OR = 3.50$ (95% CI: 1.152 to 10.633) means that respondents who have no good dressing habits 3.50 times higher risk of filariasis compared with respondents who have a habit of dressing well and dressing habits are risk factors for incident filariasis. The results of the study is in line with research conducted by Uloli R, Soeyoko, Sumarni (2008) in the district of Gorontalo Province Bonebolango found that respondents who have a habit of not properly dressed 2.433 times more risky than having a habit of dressing well and has a significant relationship. The use of fine clothing can reduce the risk of mosquito bites. This relates to the risk of anopheles mosquito bites at night to *Microfilariae* that are periodic nocturnal or day and night for microfilariae sub periodic and non-periodic nocturnal (Reyke Uloli, 2008). Statistical test results obtained $p > 0.05$ ($p = 0.683$), meaning that there is no significant relationship between the incidence of animal care reservoir with filariasis. The results of this study differ from research conducted by Gusti Rahmat (2012) in the city of Padang. It was found that respondents who raise animals reservoir 3.6667 times more risky than not maintain animal reservoir and has a significant relationship. Some animals can be a host of filariasis. Of all the species of filarial worms that infect humans in Indonesia, only periodic *Brugiamalayi* subtype and non-periodic nocturnal found in langurs (*Presbytiscristatus*), monkey (*Macacafascicularis*), and cats (*Feliscatus*).

Based on the results obtained by statistical test p value > 0.05 ($p = 0.375$), meaning that there is no significant relationship between the presence of gardens ≤ 500 meters with the incidence of filariasis. The results of this study differ from research conducted by Jontari (2008) in Agam District West Sumatra province to obtain residence respondents ≤ 500 meters of gardens 15.94 times riskier than respondents whose residence > 500 meters from the garden and has a significant relationship. Most gardens cultivated by the people in the study area is a forest in the hills that are around the houses. This condition should lead to high potential contact between mosquitoes as vectors of filariasis with community, but this is not entirely the case study areas (Jontari, 2014).

Based on the results obtained by statistical test $p > 0.05$ ($p = 0.625$), meaning that there is no significant relationship between the presence of rice fields ≤ 500 meters with the incidence of filariasis. Results are similar to the research conducted by Jontari (2008) in Agam District of West Sumatra Province of respondents who obtained his residence ≤ 500 meters from the fields of 1.96 times the risk than respondents whose residence > 500 meters from the field and had a significant relationship. Rice field is a breeding place for *Anopheles Barbirostitis* with *Brugiamalayi* periodic nocturnal type. A place to stay close to the rice fields of respondents would cause more contact with mosquitoes and the risk of contracting becomes larger (Jontari, 2014).

Based on the results obtained by statistical test $p > 0.05$ ($p = 0.727$), meaning that there is no significant relationship between the presence of the river ≤ 500 meters with the incidence of filariasis. These results together with research conducted by Gusti Rahmat (2012) in the city of Padang

obtained residence respondents ≤ 500 meters from the river 6 times the risk of filariasis than respondents whose residence > 500 meters from the river and has a significant relationship. A watershed is a breeding place for mosquitoes that *Brugiamalayi* filarial vectors. Streams that become the most preferred breeding place is a river with a quiet stream and there are aquatic plants. Results of research in Pasaman Barat obtained as much as 67.11% of respondents living near the river suburbs but the majority of them using nets bedtime. River in of Pasaman Barat generally have a fast flow so that mosquitoes do not like and difficult to breed in the river. This resulted in no significant correlation between the presence of the river with the incidence of filariasis. Based on the results obtained by statistical test p value < 0.05 ($p = 0.00341$), meaning that there is a significant association between the presence of swamps ≤ 500 meters with the incidence of filariasis. Based on statistical calculations obtained $OR = 11$ (95% CI: 1.42 to 85.20) means that respondents residence ≤ 500 meters from the swamp 11 times the risk of filariasis than respondents whose residence > 500 meters from the swamp. These results together with research conducted by Jontari (2008) in Agam District of West Sumatra Province of respondents who obtained his residence ≤ 500 meters from the swamp 6.26 times the risk of respondents residence > 500 meters from the marshes and has relationships significant. Conditions swampy environment is a good place for the development of mosquitoes. The ability to fly mosquito and supported distance and wind speed causes the existing environment around the marsh at high risk for filariasis. *Mansonia* spp with *Brugiamalayi* periodic nocturnal type easily found in this area (Jontari, 2014). Based on the observation, research shows many regions there are marshes within the residence of the respondent. This certainly increases the risk of incidence of filariasis.

Statistical test results obtained value of $p > 0.05$ ($p = 0.625$), meaning that there is no significant relationship between the presence of shore ≤ 500 meters with the incidence of filariasis. Together with the results of research studies conducted by Jontari (2008) in the village Ketosari Agam District West Sumatra Province was found that the absence of a significant correlation between the presence of residence respondents ≤ 500 M from the beach tepiaanfilaria events. Resident who used to work as fishermen chose to build a residence close to the beach. During the study found many people who have a residence close to the beach, but not infected with filariasis as influenced by environmental factors or other measures such as using a wire netting and their home away from marshes. This resulted in no significant correlation between the presence of the beach with the incidence of filariasis.

Based on the results obtained by statistical test p value > 0.05 ($p = 0.375$), meaning that there is no significant relationship between the presence of shrubs ≤ 500 meters with the incidence of filariasis. Together with the results of research studies conducted by Hendrik Rahmat Hidayat (2012) in the South Coastal District found that there was no significant relationship between the presence of the beach with the incidence of filariasis. The existence of dense shrubs and blocking sunlight to the ground causing the surrounding environment into a shady and moist. These conditions favor as breeding sites and resting mosquitoes that will increase the risk of the incidence of filariasis.

Based on the results obtained by statistical test p value <0.05 ($p = 0.0351$), meaning that there is a significant relationship between the ceiling of the house with the incidence of filariasis. Statistical calculations derived from $OR = 3.67$ (95% CI: 1.023 to 13.14) means that respondents who do not have a home ceiling of 3.67 times the risk for filariasis compared with respondents who have a home ceiling and ceiling of the house is a risk factor for the incidence of filariasis. Together with the results of research studies conducted by Juriastuti P et al in the Village JatiSampurna found that there is a significant relationship between the ceiling of the house with filariasis. Dari incident observation, filariasis patients generally come from families with low economic status and education so that they just enough income to daily needs. Their homes are generally simple and there is even a semi-permanent home and the majority do not have the ceiling of the house. It is certainly easier for mosquitoes to bite out of the house and occupants of the house. Based on the analysis in Table 4 found significant independent variables to contribute to the incidence of filariasis is home ceiling with a p-value of 0.021. From the statistical test calculations obtained $OR = 5.12$ (95% CI: 1.279 to 20.470).

That is, respondents who do not have the ceiling of the house will be at risk of filariasis by 5.12 times compared with respondents who have a home ceiling. Thus the dominant factors are most at risk for the incidence of filariasis in West Pasaman 2014 that ceiling rumah. Hasil this study also corroborated by research Praise Juriastuti et al (2010) in the village JatiSampurna Bekasi City with case control design, where respondents who did not have a ceiling 17.225 times exposed to risky home filariasis and become the dominant risk factor filariasis causes of events with p value = 0.001 95% CI: 3.192 to 92.964. Ceiling itself is useful as a separator between the tiles with a room that is not directly related. So it can be said that where the ceiling is quite important so that mosquitoes do not freely enter the house through cracks precarious. Based on the observation of the majority of respondents do not have a home or have a ceiling ceiling home condition is not good. They reasoned do not have enough to make a charge. The ceiling of the house. Thus the dominant risk factor incidence of filariasis is home ceiling.

Conclusions and suggestions

Almost all respondents at risk of filariasis by the use of wire netting, level of education and the home ceiling. More than half of respondents at risk of filariasis is based on the level of knowledge, habits out of the house at night, use a mosquito net while sleeping, dressing habit, the habit of keeping animals reservoir, where the residence of ≤ 500 meters from plantations, rivers, beaches, bush beluka. Less than half of respondents at risk of filariasis is based on the use of anti-mosquito, ethnicity, presence of residence ≤ 500 meters from rice fields and marshes. Spatially known that the distribution of the incidence of filariasis in Pasaman Barat present in 9 of 11 districts. Distribution of the incidence of filariasis is generally found in the river, bushes, plantation, marshes. Most artifacts spread of filariasis in Sungai Aur. Risk factors that have a significant role and strength of the relationship is the use of mosquito nets bedtime and dress habits, presence of swamps and home ceiling. While the risk factors that do not have a meaningful role and relationship is the level of knowledge, education level, ethnicity, use of wire netting, the habit of

going out at night, the use of anti-mosquito and habits of animals maintain the reservoir, where the plantation, where rice fields, where the river, where the beach, where shrubs. The most dominant risk factors affecting the incidence of filariasis in Pasaman Barat 2014 is home ceiling. Vector control programs need to be implemented and integrated environment to strengthen cooperation across sectors (Pasaman Barat Health Office, Department of Agriculture Pasaman Barat, Pasaman Barat BLHKP) between the government and local communities to prevent vector breeding places around settlements. By knowing the area of distribution of filariasis cases in West Pasamanie plantations, rice fields, rivers and bushes, should be carried out identification transmitting mosquitoes as vectors of filariasis by further research or related institutions (Pasaman Barat Health Office) in order to determine how prevention and eradication of vectors based on the type of mosquito. It is recommended to the Office of Health of Pasaman Barat coordinate with the Regional Government of Pasaman Barat to improve healthy home renovation program for the poor. It is recommended for health workers to conduct health education about filariasis so that people take steps to prevent such filariasis nets bedtime. , And invites the community to reduce the frequency of out at night to reduce the intensity of contact with mosquitoes and do not live in the vicinity of vector breeding places such as swamps, rivers, farm fields. For people who are out of the house suggested that using topical mosquito repellent and wearing clothing that protects the entire body from mosquito bites. Free mosquito net programs should be distributed evenly to the entire community.

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