

Risk Factors of Lymphatic Filariasis in Manokwari, West Papua

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ABSTRACT

Introduction: Lymphatic filariasis is parasitic disease caused by three worm species, *Brugia malayi*, *Brugia timori*, and *Wuchereria bancrofti*. The prevalence of lymphatic filariasis in Indonesia is still high with microfilaria rate 3.1%. The highest rate is found in Papua, Aceh, Maluku, and NTT with the range from 6.9% to 11.6 % in 2001. Microfilaria rate is documented 7.3% in Manokwari Regency. However, the risk factors associated with lymphatic filariasis there is still unclear.

Objectives: The aim of this study is to determine the risk factors associated with lymphatic filariasis in Manokwari Regency, West Papua

Methods: This study was observational analytic study, with case control design. One hundred forty four persons were enrolled in this study, 72 persons as case group and 72 persons as control group. The risk factors data were collected by direct interview analyzed by bivariate and multivariate analysis.

Results: Living near swamp [OR (95%CI), 5.8 (2.3-14.2); $p < 0.001$], low income [OR (95%CI), 4.8 (1.8-12.9); $p = 0.002$], low level of knowledge [OR (95%CI), 3.4(1.4-8.6); $p = 0,009$], not using mosquito bed net [OR (95%CI), 4.6(2.0-10.8); $p < 0.001$], and minimal clothing [OR (95%CI), 4.1(1.8-9.8); $p = 0,001$], were associated with lymphatic filariasis in Manokwari Regency.

Conclusion: Risk of factor lymphatic filariasis Manokwari Regency, West Papua Province, are living near swamp, low income, low level of knowledge, not using mosquito bed net, and minimal clothing.

Keywords: Risk factor, filariasis, Manokwari, West Papua

INTISARI

Pendahuluan: Filariasis limfatik adalah penyakit parasitik yang disebabkan oleh tiga spesies cacing, yaitu *Brugia malayi*, *Brugia timori*, dan *Wuchereria bancrofti*. Prevalensi filariasis limfatik di Indonesia tergolong tinggi dengan angka mikrofilaria sebesar 3,1%. Angka tertinggi dijumpai di Papua, Aceh, Maluku, dan NTT dengan rentang antara 6,9% sampai 11,6 % pada tahun 2001. Angka mikrofilaria sebesar 7,3% dilaporkan di Kabupaten Manokwari. Namun, faktor-faktor risiko yang berkaitan dengan kejadian filariasis limfatik di sana masih belum jelas.

Tujuan: Penelitian ini bertujuan untuk mengetahui faktor-faktor risiko yang berkaitan dengan kejadian filariasis limfatik di Kabupaten Manokwari, Propinsi Papua Barat.

Metode: Penelitian ini merupakan penelitian analitik obeservasional dengan rancangan kasus control. Seratus empat puluh empat orang diikutkan dalam penelitian ini, terbagi atas 72 orang dalam kelompok kasus, dan 72 orang dalam kelompok control. Data faktor risiko diperoleh dengan wawancara langsung dan diolah dengan analisis bivariat dan multivariate.

Hasil: Hidup dekat rawa [OR (95%CI), 5.8 (2.3-14.2); $p < 0.001$], pendapatan rendah [OR (95%CI), 4.8 (1.8-12.9); $p = 0.002$], tingkat pengetahuan rendah [OR (95%CI), 3.4(1.4-8.6); $p = 0,009$], tidak menggunakan kelambu [OR (95%CI), 4.6(2.0-10.8); $p < 0.001$], dan memakai pakaian terbuka [OR (95%CI), 4.1(1.8-9.8); $p = 0,001$], berkaitan dengan filariasis limfatik di Kabupaten Manokwari.

Simpulan: Faktor-faktor risiko filariasis limfatik di Kabupaten Manokwari, Propinsi Papua Barat, adalah hidup dekat rawa, pendapatan rendah, tingkat pengetahuan rendah, tidak menggunakan kelambu, dan memakai pakaian terbuka.

Kata kunci: Faktor risiko, filariasis, Manokwari, Papua Barat

INTRODUCTION

Lymphatic filariasis is a parasitic disease caused by three worm species, *Brugia malayi*, *Brugia timori*, and *Wuchereria bancrofti*. It is transmitted by 23 mosquito specieses from five genus, Anopheles, Mansonia, Culex, Aedes, and Amigeres¹.

World Health Organization reported the increasing prevalence and wider distribution of lymphatic filariasis worldwide. The prevalence increased sharply from 25 million cases in 2000 to 122 million and 250 million cases in 2003 and 2004 respectively. In 2000, this disease circulated only in 12 countries around the world. However, in 2003 and 2004, filarial infection had already detected in 36 and 39 countries respectively².

In Indonesia, the prevalence of lymphatic filariasis is high. In 1999, the microfilaria rate was 3.1%. The highest prevalence was documented in Papua, Aceh, Maluku, and Nusa Tenggara Timur, ranged from 6.9% to 11.6 %³ in 2001. Public Health Service of Manokwari Regency conducted survey in 2007 at five endemic districts with 2.455 surveyed subjects, and found microfilaria rate 7.3%⁴. However, data according the risk factors associated with filarial infection in Manokwari Regency is still unclear. The aim of this study is to determine the risk factors associated with lymphatic filariasis in Manokwari Regency, West Papua Province.

MATERIALS AND METHODS

This study was analytical observational study, with case control design, performed in Manokwari Regency, West Papua Province. A total of 144 persons were included in this study, consisting of 72 persons in case group and 72 persons in control group. Case group was all patients with filariasis in Manokwari Regency. The patients were infected by *Wuchereria bancrofti* or *Brugia malayi* and detected by standard diagnostic method of thick blood smear with 5% Giemsa stain.

Controls were selected from people who lived in same area with cases and had no lymphatic filariasis confirmed by microscopic test. Cases and controls were matched for sex, age, and residency. Simple random sampling was used to select 72 matched controls. Children under two years, pregnant women and people with severe chronic illness were excluded from the study. Risk factors data were collected by direct interview using a standardized questionnaire. Ethical clearance of this study was reviewed and approved by institutional review boards in Faculty of Medicine, Gadjah Mada University, Yogyakarta, Indonesia.

Data were analyzed by logistic regression in bivariate and multivariate analysis using Statistical Package for the Social Sciences (SPSS) version 15. OR value > 1 , and p value < 0.05 was considered statistically significant⁵.

RESULTS AND DISCUSSION

Risk factors analysis was shown in Table 1. Based on multivariate analysis, living near swamp, not using bed net, minimal clothing, low income, and low level of knowledge were the

risk factors of lymphatic filariasis in Manokwari Regency. Living near a swamp had the highest OR and thus, become the strongest risk factor for lymphatic filariasis in Manokwari Regency.

Table 1. Bivariate and multivariate analysis on risk factors of lymphatic filariasis Manokwari Regency

Variable	Bivariate		Multivariate	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Farmer	4.9 (1.6-15.1)	0.006		
Low income	6.1 (1.9-19.9)	0.003	4.8 (1.8-12.9)	0.002
Low level of knowledge	3.8 (1.3-10.7)	0.013	3.4 (1.4-8.6)	0.009
Not using bed net	4.3 (1.7-10.8)	0.002	4.6 (2.0-10.8)	0.000
Had activity at night	3.8 (1.4-10.7)	0.010		
Minimal clothing	3.6 (1.4-9.6)	0.010	4.1 (1.8-9.8)	0.001
Living near swamp	4.5 (1.7-11.9)	0.002	5.8 (2.3-14.2)	0.000
Living near rice field	3.1 (1.0-9.6)	0.080		

People who live < 200 m from swamp have higher risk to get lymphatic filariasis because swamp area is a breeding habitat of mosquito. This could also relate to mosquito bite behavior, exophagic (outdoors) and endophagic (indoors). *Mansonia* actually have exophagic behavior, however some of its species have endophagic behavior⁶. Our study showed that people living near swamp have 5.8 times risk of lymphatic filariasis. This result was similar to previous study conducted in West Tanjung Jabung Regency, Bone Bolango Regency, and West Bangka Regency^{7,8,9}.

Breeding habitat and behavior of the different vector species should be considered in carrying an effective vector control. Indoor residual spraying (IRS), expanded polystyrene beads, long lasting insecticide impregnated nets, environmental management, and biological control are the most common approach of vector control¹⁰.

People with low income and low level of knowledge also have higher risk acquiring filarial infection. This people usually were lack

of information about filarial infection and its drug administration, and have limited access to health facilities. Our obtained results were similar with a study in Bone Bolango Regency, with OR of low income 2.4 and OR of low level of low knowledge 2.0⁸.

According to Soeyoko, filariasis infection is closely related to socio cultural aspects, for example knowledge, belief, and habit of people¹¹. Coreil and colleagues conducted a study in Haiti and found that knowledge was strongly associated with lymphatic filariasis events¹². Knowledge plays an important role in people action¹³. The income and level of knowledge affect behavior of people in preventive attempt and abatement of filariasis.

The people behavior of do not using bed net was also increasing the risk of filarial infection. Previous studies in Baturaja City, Sambas Regency, and Agam Regency revealed similar results, with OR 2.1, 3.7, and 2.1 respectively^{14,15,16}. Cohort study by Uphadyayula and colleagues in India showed that imparting of protection measures against mosquitoes using

insecticide treated bed nets would substantially reduce the disease¹⁷.

The vector and host contact also can be prevented by using other available personal protection methods such as proper clothing and repellent^{18,19}. This study showed that using long clothes and pants when go out decreasing the risk acquiring filarial infection. A study in Pekalongan Regency had similar finding with OR 15.2²⁰. Using proper clothes and pants when go out at night might prevent filariasis.²¹ Using repellent extracted from local crop such as serai, lavender flower, Geranium and Zodia is also effective. These repellents contain monoterpene compound which can prevent mosquito bite²².

Eradication of lymphatic filariasis in Indonesia is doing through Filariasis Elimination Program. Indonesia is currently pursuing a status to be a filariasis-free country by 2020 to comply with the target date set by WHO Southeast Asia Region through the Global Alliance for Elimination of Lymphatic Filariasis (GAELF). To achieve the goal, the government has declared October as Filariasis Elimination Month (Belkaga), during which a mass drug administration is held, with people from endemic regions taking anti-filariasis drugs simultaneously²³.

CONCLUSION

Risk of factor lymphatic filariasis Manokwari Regency, West Papua Province, are living near swamp, low income, low level of knowledge, not using mosquito bed net, and minimal clothing.

REFERENCES

1. World Health Organization. The Weekly Epidemiological Report: Lymphatic Filariasis. Geneva, 2002.
2. World Health Organization. Fact Sheets: Lymphatic Filariasis. Geneva, 2000. Accessed on February 14th, 2007.
3. Direktorat Jenderal PP dan PL, Departemen Kesehatan. *Epidemiologi Filariasis*. Jakarta, 2006.
4. Dinas Kesehatan Kabupaten Manokwari. *Laporan Tahunan*. Manokwari, 2008.
5. Sastroasmoro S, Ismael S. *Dasar-dasar Metodologi Klinis*, 2nd Edition. Sagung Seto, Jakarta, 2002.
6. World Health Organization. A Handbook for National Elimination Program. Italy, 2013.
7. Putra A. *Faktor Risiko Kejadian Filariasis di Kabupaten Tanjung Jabung Barat Provinsi Jambi*. [Thesis]. Program Studi Ilmu Kesehatan Masyarakat, Field Epidemiologi Training Program, Universitas Gadjah Mada. Yogyakarta, 2007.
8. Uloli R. *Analisis Faktor-faktor Risiko Kejadian Filariasis di Kabupaten Bone Bolango Propinsi Gorontalo*. [Thesis]. Program Studi Ilmu Kesehatan Masyarakat, Field Epidemiology Training Program, Universitas Gadjah Mada. Yogyakarta, 2007.
9. Nasrin. *Faktor-faktor Lingkungan dan Perilaku yang Berhubungan dengan Kejadian Filariasis di Kabupaten Bangka Barat*. [Thesis]. Jurusan Kesehatan Lingkungan, Universitas Diponegoro. Semarang, 2008.
10. Research Triangle International. Integrated Vector Management. Durham, 2010.
11. Soeyoko. *Penyakit Kaki Gajah (Filariasis Limfatik): Permasalahan dan Alternatif Penanggulangannya*. [Pidato Pengukuhan Jabatan Guru Besar]. Fakultas Kedokteran, Universitas Gadjah Mada. Yogyakarta, 2002.
12. Coreil J, Mayard G, Addiss D. Support Group for Women with Lymphatic Filariasis in Haiti, Special Programme for Research and Training in Tropical Disease (TDR). Geneva, 2003.
13. Notoatmodjo. *Promosi Kesehatan dan Ilmu Perilaku*. Rineka Cipta, Jakarta, 2007.

14. Taviv Y, Milana S, Aprioza Y. *Perilaku Penggunaan Kelambu dan Rumah Sehat Terhadap Kejadian Penyakit Tular Vektor (Malaria, Filariasis, dan DBD) pada Masyarakat di Provinsi Jambi*. 2010.
15. Ardias, Setiani O, Yusniar HD. *Faktor Lingkungan dan Perilaku yang Berhubungan dengan Kejadian Filariasis di Kabupaten Sambas*. *Jurnal Kesehatan Lingkungan Indonesia*, 2012;11(2):199-207.
16. Jontari H, Kusnanto H, Supargiyono, Sadea H. *Faktor Risiko Kejadian Penyakit Lymphatic Filariasis di Kabupaten Propinsi Sumatera Barat, Tahun 2010*. *Outbreak Surveillance and Investigation Report*, 2010;7(1):9-15.
17. Upadhyayula SM, Mutheneni R, Kadiri M, Kumaraswamy S, Nagala B. *A Cohort Study of Lymphatic Filariasis on Socio Economic Conditions in Andhra Pradesh India*. *PLoS One*, 2012;7(3): 1-8.
18. Direktorat Jenderal PP dan PL, Departemen Kesehatan. *Pedoman Penatalaksanaan Kasus Klinis Filariasis*. Jakarta, 2005.
19. Korgaonkar NS, Kumar A, Yadav RS, Kabadi D, Dash AP. *Mosquito Biting on Humans and Detection of Plasmodium falciparum Infection in Anopheles stephensi in Goa, India*. *Indian J Med Res*, 2012;135(1):120-6.
20. Amelia R. *Analisis Faktor Risiko Kejadian Penyakit Filariasis*. *Unnes Journal of Public Health*, 2014;3(1):1-12.
21. Sarungu Y, et al. *Faktor Risiko Lingkungan dan Kebiasaan Penduduk yang Berhubungan dengan Kejadian Filariasis di Distrik Windesi, Kabupaten Yapen Waropen, Provinsi Papua Barat*. *Jurnal Kesehatan Lingkungan Indonesia*, 2012;2(1):76-81.
22. Baskoro DA, Iskandar A, Fadila EA. *Uji Potensi Minyak Peppermint (Mentha piperita Linn) Sebagai Repellent Terhadap Nyamuk Culex sp pada tikus (Rattus norvegicus) Strain Wistar*. Fakultas Kedokteran Universitas Brawijaya. Malang, 2010.
23. The Jakarta Post. *Partnership Crucial to Filariasis Elimination Program*. 2015. Access on September 13rd 2015. Available from <http://www.thejakartapost.com/news/2015/09/08/partnership-crucial-filariasis-elimination-program.html#sthash.TRtJx65Q.dpuf>.