Filariasis malayi in Pondok Village, West Umbu Ratunggay, Central Sumba Regency

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ABSTRACT

Introduction: Lymphatic filariasis is a communicable disease that still cause public health problem include in Sumba Island, East Nusa Tenggara Province. The cause of disease is three species of filaria and had been distributed almost in all area of Indonesia. There are differences in the distribution of species in the Indonesian region

Objectives: To investigate the profile of filariasis, the species and *Microfilaria rate* in Pondok Village.

Methods: The sample was all of population in Pondok Village who meet the criterion and examination was performed by observation and fingerprick blood survey.

Results: Fingerprick blood survey was performed on 500 respondents and was found 23 respondents suffered microfilaremia. Based on their clinical symptoms it was found 45 respondents had acute limfangitis symptoms, headache and frequent relapse fever (10 was positive mikrofilaremia) and 4 respondents suffered chronic symptoms. Based on the microfilaria morfology identification it was known that all of the filariasis caused by *Brugia timori* species.

Conclusion: Pondok Village was lymphatic filariasis endemic area, caused by *Brugia timori* with microfilaria rate at 4,6%.

Keywords : Filariasis, Microfilaria rate, *Brugia timori*, Sumba Island.

INTISARI

Pendahuluan: limfatik filariasis adalah penyakit menular yang masih menimbulkan masalah kesehatan masyarakat termasuk di Pulau Sumba, Provinsi Nusa Tenggara Timur. Penyebab penyakit ini adalah tiga spesies cacing filaria yang terdistribusi hampir di seluruh wilayah Indonesia. Setiap spesies filaria memiliki distribusi geografis yang berbeda.

Tujuan: Untuk mengetahui gambaran filariasis, identifikasi spesies dan menghitung angka mikrofilaria di desa Pondok Pulau Sumba.

Metode: Sampel adalah semua penduduk di desa Pondok yang memenuhi kriteria. Penelitian dilakukan dengan metode observasi dan pemeriksaan darah dari ujung jari.

Hasil: Pemeriksaan darah dilakukan pada 500 responden dan ditemukan 23 dengan microfilaremia. Berdasarkan gejala klinis maka ditemukan 45 responden memiliki gejala limfangitis akut, sakit kepala dan demam kambuhan (10 diantaranya positif mikrofilaremia) dan 4 responden menderita gejala kronis.

Berdasarkan hasil identifikasi morfologi mikrofilaria dapat diketahui bahwa semua penyebabnya adalah *Brugia timori*.
Simpulan: Desa Pondok adalah daerah endemis filariasis yang disebabkan oleh *Brugia timori* dengan angka mikrofilaria 4,6%.

Kata kunci: Filariasis, Angka mikrofilaria, *Brugia timori*, Pulau Sumba.

INTRODUCTION

Lymphatic filariasis is a communicable disease caused by nematoda infection from Filariodides family in limph vessels and gland. The number of limfatic filariasis throughout the world until 2010 was estimated 120 millions people and more than 1.3 billions was threathened to be infected and the most was scattered in Southeast Asia Region include Indonesia [1].

The main goal of *Global Program to Eliminate Lymphatic Filariasis* is to eliminate this disease which is caused by *Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori,* throughout the world. This is because limphatic filariasis is treatable disease and their transmission chain is breakable[2]. Indonesian government in 2002 in Banyuasin declared the starting of filariasis elimination and established filariasis elimination as a one of communicable disease eradication priority programs throughout Indonesian area[3].

Lymphatic filariasis not cause direct mortality but the increasing of the prevalence significantly cause a poverty and able to impede the achievement of *Milenium Development Goals* (*MDGs*). Acute filariasis patients will spend time about 5 weeks per year in bed, which is equivalent to 11% of their productive period. The economic loss for this disability was estimated achieve 67% of their monthly domestic expenditure. Economic loss per chronic filariasis individu was about IDR 735,380 per year, including treatment and drugs cost and economic loss for productivity loss, productivity period loss of cronic filariasis[4].

The number of filariasis incidence in Indonesia until to 2009 was 11.914 and East Nusa Tenggara Province (NTT) was the second greatest contributor with 1.749 incidences[5]. The report from Health Office showed that one of region in East Nusa Tenggara Province which had many filariasis incidences was Central Sumba Regency. Until to 2010, the number of filariasis incidences that had been treated achieved 328 incidences.

Filariasis incidences in East Nusa Tenggara Province was only found in several villages area whereas in other area was still not studied yet. Filariasis epidemiology for each area was very different because in principle there are geographical area characteristics and climate difference between one area to other area. The purpose study is is epidemiology filarias study is determining the endemicity of the area, the factors which influencing and their eradication planning. In this study it is reported the result of descriptive study from fingerprick blood survey on the population in Pondok Village, West Umbu Ratunggay Subdistrict, Central Sumba Regency.

MATERIALS AND METHODS

Location of the study

The study was performed in Pondok Village were in the West Umbu Ratunggay Subdistrict, Central Sumba Regency, that is located at $9^0$31'08"- $9^0$32'16" South Lattitude and $119^0$31'06"- $119^0$33'52" East Longitude. The location of the study is far from the coastal area with altitude at 270-400 meter above sea level with hilly topographic area for settlement area (villages) and plain area below the hill as a rice fields area. There are five water springs that is flowing to one big river that extend throughout the central of the village and never dry throughout year thus make the rice fields area as very better for disease vector mosquito breeding habitat.

The subject of the study and blood sampling

The subject was all population in Pondok Village, more than 5 years old and who was willing to participated in the study. The minimum sample size for fingerprick blood survey was 500 people according to the standard of calculation microfilaria rate (*mf rate*) in the village[3]. Blood fingerprick was collected during night time by visiting a quarters where chronic filariasis inhabitant.

Fingerprick blood samples was collected in November 2011 and started at 08:00PM local time. Morphology of microfilaria was identified microscopically by Giemsa[7] staining. Oval thick blood film with size of ± 1 x 2 cm was made from about 60 µl blood sample, then let it dry for at least 3 hours. The next steps was hemolysis by using water and Giemsa staining. The species of microfilaria was identified microscopically[8]. Clinical signs and symptoms were observed individually.

RESULTS AND DISCUSSIONS

Fingerprick blood survey

There were 23 filaremia people out of 500 respondents (Table 1). Demographic profile showed that number of filaremia in male (15) was higher than female (8), the youngest filaremia was male 7 years old.

Table 1. Distribution of filariasis by age, sex and residence in Pondok Village, 2011

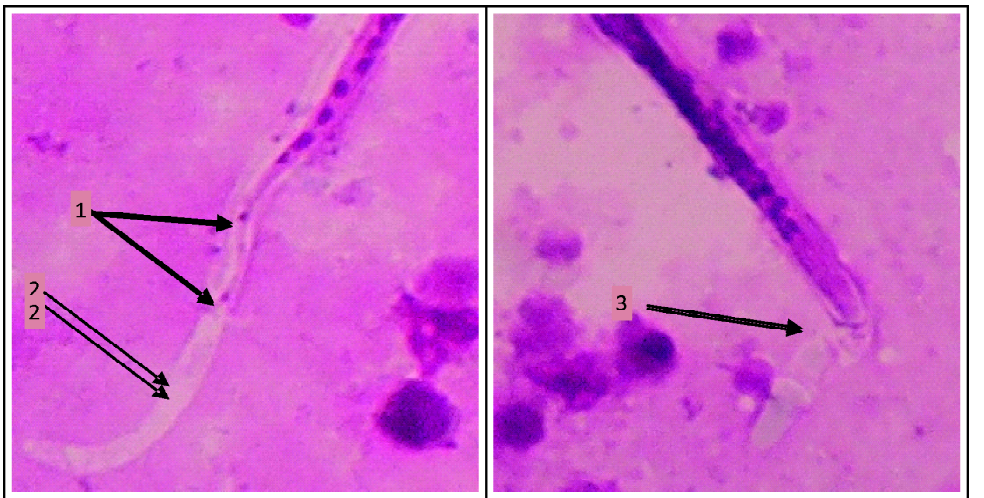
No	Age (year)		Adress (Quarter)	Blood examination	
	M	F		Species	Microfilaria rate /60 µl
1	62		Manupaiwo	*Brugia timori*	4
2	30		Malisa	*Brugia timori*	7
3	35		Manalosua	*Brugia timori*	4
4	42 [1)]		Manalosua	*Brugia timori*	7
5		10 [1)]	Manalosua	*Brugia timori*	80
6		8 [1)]	Manalosua	*Brugia timori*	19
7		43	Manalosua	*Brugia timori*	6
8	30		Manalosua	*Brugia timori*	5
9	32		Manalosua	*Brugia timori*	26
10	18 [2)]		Manalosua	*Brugia timori*	21
11		8 [2)]	Manalosua	*Bru gia timori*	1
12	40 [3)]		Malisa	*Brugia timori*	1
13	7 [3)]		Malisa	*Brugia timori*	4
14	25 [4)]		Malisa	*Brugia timori*	2
15		40 [4)]	Malisa	*Brugia timori*	2
16	38		Malisa	*Brugia timori*	16
17	50		Malisa	*Brugia timori*	16
18	32 [5)]		Malisa	*Brugia timori*	1
19		25 [5)]	Malisa	*Brugia timori*	17
20		40	Malisa	*Brugia timori*	28
21		52	Malisa	*Brugia timori*	23
22	55		Malisa	*Brugia timori*	11
23	35		Malisa	*Brugia timori*	20
Total	15	8			321

Explanation: [1) 2) 3) 4) 5)] *= people who live in the same house*
M = Male
F = Female

Table 1 showed that the highest microfilaria rate was 80 /60 µl blood in 10 years old female who was still in their elementary school. The filariasis distribution was scattered in three quarters but the most prevalence was in Malisa Quarter that was 13 (56,52%).

The species of microfilaria

Filariasis in East Nusa Tenggara was caused by *Brugia malayi* and *Brugia timori*, while *Wuchereria bancrofti* has not reported yet[9]. Based on the morphologic identification it was found that all samples were *Brugia timori*. The morphology of *Brugia timori* microfilaria can be seen at Figure 1.



1. Terminal nuclei at the tail
2. Microfilaria' sheath
3. Head space

Figure 1. The morphology of *Brugia timori* microfilaria under microscopic observation that was found in Pondok Village, 2011.

Microfilaria rate

Microfilaria rate is a proportion between the number population whose their blood are positive microfilaria to the total population examined[7]. The microfilaria rate in Pondok Village was 4,6%.

Accute disease rate and chronic disease rate

Observation and interview to the 500 respondents showed that 45 (9%) people suffered accute symptoms that were limphangitis descendens accompanied by fever, headache, limp but dissappear and relapse again frequently, whereas 4 (0.8%) people were chronic filariasis with elephantiasis at legs and arms.

Table 2. Filariasis based on age group, clinical symptoms and microfilaremia in Pondok Village, 2011

Age (year)	Number of people	Filariasis symptoms						Micro-filaremia	%
		Acue	%	Chronc	%	Total	%		
≤10	28	2	0.4	0	0	2	0.4	4	14.29
11 - 20	55	2	0.4	0	0	2	0.4	1	1.82
21 - 30	95	8	1.6	0	0	8	1.6	4	4.21
31 - 40	119	11	2.2	0	0	11	2.2	8	6.72
41 - 50	105	11	2.2	3	0.6	14	2.8	3	2.86
51 - 60	72	7	1.4	1	0.2	8	1.6	2	2.78
>60	26	4	0.8	0	0	4	0.8	1	3.85
Total	500	45	9	4	0.8	49	9.8	23	4. 60

Table 3. Distribution of filariasis by residential location and symptoms in Pondok Village, 2011

Location	Filariasis					
	Acute	PB +	Chronic	PB +	No symptoms	PB +
Manupaiwo quarter	8	1	1	0	111	0
Malisa quarter	20	5	1	0	381	8
Manalosua quarter	17	4	2	0	202	5
Total	45	10	4	0	451	13

Data on Table 2 and 3 showed that among 45 people with clinical symptomps of acute filariasis, only 10 people positive microfilaremia. There was no microfilaremia and asymptomatic filariasis on 4 and 13 (56.52%) people with chronic filariasis respectively.

The result of fingerprick blood survey in this study showed that Pondok Village was filariasis endemic village considering the microfilaria rate was above 1%. According to WHO, any endemic area with microfilaria rate >1%, control management should be done as soon as posible to break the chain of transmission such as mass drug treatment[3].

The filariasis incidence by age group showed that the highest was in ≤ 10 years old that was 14,29% (Table 2). The number of microfilaremia incidence in the children were 4 children and all of them were live in one house with their parents or their family who were also positive filariasis. This showed that the filariasis transmission still continue in the community. Filariasis on children age group in any area showed that the transmission had already occured for long time and until to now was still occurs effectively[10].

The species of microfilaria based on microscopic identification of 23 respondents who was positive microfilaremia was *Brugia timori*. The specific morphology which determining and differentiate *Brugia malayi* to the other species are (1) the number of terminal nuclei at the tail, that is 2, (2) microfilaria'sheath wich extend beyond the head and tail, (3) proportion of length and width of head space is 3:1 (Figure 1)[8]. *Brugia timori* microfilaria in Pondok Village, Central Sumba was same to filariasis types which was ever found in several other islands in Flores, Alor and Timor Island[9,10,12].

There was no corelation between microfilaremia and clinical symptoms, some microfilaremic patients did not showed any clinical symptoms while some amicrofilaremic patients had clinical symptoms. At high endemic area, clinical symptomts mostly found in young age group.

The acute disease rate (ADR) was 9% (45 out of 500 samples) with synptoms of recurrent descenden limfangitis, fever, headache and limp. Chronic desease rate (CDR) was 0.8% (4 people) with elephantiasis on the leg and arm.

Selective drug treatment had been implemented in Central Sumba Regency by Health office since 2006. Amicrofilaremic patients tends to be missed from the treatent

and become source of transmission. Prevention of the desease trans-mission can be done at least by three approaches (1) tratment to all patients (or mass drug treatment if mf rate >1%); (2) avoid contact to mosquito vectors; (3) combination of those two approaches[13]. Environmental factors also contribute to the disease transmission. Study area was about 100m from rice fields, one of filariasis mosquito vector breeding place[2].

CONCLUSION

Pondok Village was filariasis endemic area caused by Brugia timori with microfilaria rate 4,6%.

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