

DISTRIBUTION AND PREVALENCE OF CASES OF MICROFILARAEMIA IN INDONESIA

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Guna dapat merencanakan pemberantasan filariasis di Indonesia, maka diperlukan adanya data mutakhir mengenai penyakit ini diseluruh tanah air. Untuk itu sejak tahun 1970 telah diadakan berbagai survei, diantaranya untuk melihat distribusi dan prevalensi penderita microfilaraemia yaitu penduduk yang mengandung bibit penyakit ini didalam darahnya.

Sejumlah 163.454 penduduk dari 174 daerah endemis atau tersangka endemis di seluruh pelosok tanah air telah diperiksa darahnya dan 10.8 persen diantaranya melihat adanya bibit Wuchereria bancrofti, Brugia, malayi dan Brugia timori.

Anak yang terkecil ditemukan dengan bibit penyakit ini adalah berumur 6 bulan didaerah endemis Brugia malayi. Prevalensi penyakit terlihat meningkat menurut golongan umur dan tidak banyak berbeda menurut jenis kelamin. Kecuali di beberapa daerah terlihat golongan lelaki lebih banyak menderita dibandingkan golongan wanita.

Walaupun pada beberapa tempat terlihat penurunan prevalensi dibandingkan dengan hasil survei terdahulu, namun saat ini terlihat bahwa filariasis masih tersebar luas terutama didaerah pedusunan diluar Jawa Bali. daerah mana merupakan daerah pembangunan ekonomi yang dikaitkan dengan program transmigrasi nasional.

One of the major aspects of the economic development program for rural areas of Indonesia has been the channeling of under-employed and unemployed farmers and their families from Java, Bali and Lombok to new settlements located in less populated, but promising, fertile farming areas of Sumatra, Kalimantan, Sulawesi, Maluku and West Irian. Unfortunately when transmigrants are relocated into these new areas they are often exposed to diseases, such as filariasis, with which they have not had previous experience. Brug (1928) was the first

to recognize this problem and Tesch (1937) noted the remarkably high number of Javanese transmigrants from non-endemic filarial areas suffering from filariasis compared to native-born Sulawesians living in the transmigration settlement of Kalawara, Central Sulawesi. The higher prevalence of filariasis among immigrants compared to indigenous populations has also been reported from the transmigration settlements of Wonosobo, South Sumatra (Lie and Winoto, 1960) and in Margolembo, South Sulawesi (Partono et al., 1972).

To implement control measures in support of the national and regional economic development program it was essential to obtain current information on the prevalence and distribution of filariasis in both donor and recipient areas. Large scale surveys were therefore initiated in 1970 by the Ministry of Health, the University

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of Indonesia, Faculty of Medicine and the U.S. Naval Medical Research Unit No. 2 to obtain these data. This paper is one of the series of reports resulting from these surveys and presents findings on cases of microfilaremia found during the study.

MATERIAL AND METHOD

Principal villages on most of the major islands were included in the survey. Each village was visited at least 2 hours after sunset and working into the evening, 20 ul samples of blood were obtained from the finger-tips of all individuals and entire families when possible. Thick smears were made by spreading the drops of blood collected in capillary tubes evenly onto clean microscope slides. The slides were air-dried overnight, hemolysed and stained with Giemsa (1 part stain to 14 parts buffer solution at pH 7.2). The slides were examined microscopically and the number and species of micro-filariae determined and recorded.

RESULTS

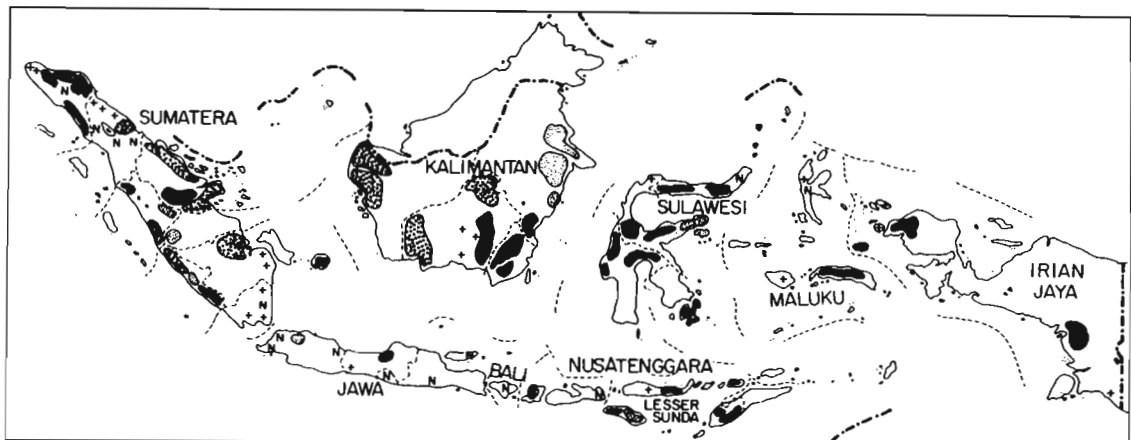
Microfilariae of *Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori* were detected in blood smears collected during these studies. Figure presents the distribution and prevalence of these microfilaremias by regency and table 1 the results by areas surveyed on the major filarial endemic islands.

On the large island of Sumatra 38,401 individual blood smears from 46 areas were examined and 8.9% found positive for *B. malayi* and or *W. bancrofti*. No microfilariae were found in 6 of the 46 areas surveyed and the highest microfilarial rate (37.5%) was in Damar Putih. Mixed infection with *W. bancrofti* and *B. malayi* was found to occur in 3 areas.

Forty-two areas in Kalimantan were surveyed and 10.8% of 45,905 persons examined were found to be positive for *B. malayi* and or *W. bancrofti*; mixed infections occurred in 5 areas. Microfilariae were detected in populations from all areas surveyed with the highest rate (21.9%) occurring in Pindih Batu.

A total of 44,456 individuals from 30 areas

Figure map of Indonesia showing the distribution and prevalence of microfilariae positive cases by regency



N - No case reported
+ - Mf rate $< 2\%$
□ Mf rate 2% - 5%

▨ Mf rate $> 5\% - 10\%$
■ Mf rate $> 10\%$

were examined in Sulawesi and 13.7% found positive for *B. malayi* and or *W. bancrofti*; mixed infections were found in 3 areas. The highest microfilarial rate (21.5%) was found in Kaluku and no evidence of infections were detected in persons from 4 areas.

B. malayi, *B. timori* and or *W. bancrofti* microfilaremias were found in people in 26 of 28 areas surveyed in Nusatenggara, Maluku, Irian Jaya. Mixed infections with *B. timori* and *W. bancrofti* were found in 14 areas and mixed *B. malayi*, *W. bancrofti* in one. *W. bancrofti* microfilaremia only was found in 9 areas. A total of 19,704 were examined and 15.5% found positive. The highest prevalence for microfilaremia (41%) was in Alor Barat Daya where both *B. timori* and *W. Bancrofti* were found.

The results from Java and Bali where microfilariae were detected in only 1.7% of 14,988 people examined. Twenty-eight areas were surveyed and only 12 were found to be endemic; *B. malayi* was found in low numbers in only one area while *W. bancrofti* was prevalent in the remaining 11 areas. The highest microfilarial rate (5.5%) was in Semarang Barat. No evidence of mixed infection was seen.

Table 1 Distribution and prevalence of filariasis in Indonesia

Islands surveyed	Number examined	Per-cent positive	Parasite species		
1. Sumatra	38,401	8.9	Bm	Wb	
2. Kalimantan	45,905	10.8	Bm	Wb	
3. Sulawesi	44,456	13.7	Bm	Wb	
4. Nusatenggara, Maluku and Irian Jaya	19,704	15.5	Bt	Bm	
5. Jawa and Bali	14,988	1.7	Wb	Bm	
Total	163,454	10.8	Bm	Wb	Bt

Table 1 summarizes the results for the major islands and shows the highest prevalence rates to be in Nusatenggara, Maluku, Irian Jaya followed by Sulawesi, Kalimantan, Sumatra and Java Bali. A total of 163,454 people were examined and 10.8% found to be microfilaria positive. Endemic foci of *B. malayi* and *W. bancrofti* was found on all islands whereas *B. timori* was found only on island of Timor, Flores, Alor and Sumba.

The age and sex distribution of cases of microfilariasis for some selected endemic areas included in this survey is presented in table 2. Microfilariae were found in all age groups and more or less equally in both sexes except in Kalimantan and Nusatenggara. The youngest found infected was a 6 month old child with *B. malayi*, the prevalence of microfilaremia tended to increase with age.

DISCUSSION

Three species of human filariae are known to be endemic to the Indonesian archipelago; *W. bancrofti*, *B. malayi* and *B. timori*. These parasites are widely distributed throughout the islands and are of great concern to the public health workers as well as authorities involved with the transmigration of population groups from Java, Bali and Lombok to the less populated islands. Since the beginning of the transmigration program public health workers have been aware of the problems associated with the movement of non-immune populations into areas endemic for certain diseases such as filariasis. Prevalence data on filariasis dates back many years and table 3 presents a comparison of results of surveys by previous investigators and results obtained more recently from surveys conducted in the same locations. In most areas the disease remains endemic, in some the prevalence rates have decreased while in others the rates have increased. In one area in Java the disease has completely disappeared because of changes in the environment and the subsequent destruction of mosquito breeding areas (Sri Ocmijati et al., 1978). Conversely, however, new

Table 2 Age-sex distribution of cases of microfilaraemia for selected areas in Indonesia

Areas surveyed	Sex	A G E - G R O U P (Y R S)						Total
		0-9	10-19	20-29	30-39	40-49	50-59	
Bengkulu (Sumatra)	M	224/4.9*	326/6.4	155/9.7	109/9.2	67/20.9	80/18.8	964/8.9
	F	235/5.5	250/8.8	132/3.0	95/6.3	76/6.6	95/11.6	883/6.9
Lampihung (Kalimantan)	M	278/4.7	358/9.8	286/10.8	297/23.2	205/24.4	181/10.5	1,605/13.5
	F	269/2.6	326/5.2	282/7.8	290/11.0	185/10.8	205/13.6	1,557/8.1
Parigi (Sulawesi)	M	366/4.6	439/7.7	253/11.5	242/17.4	122/17.2	89/6.7	1,511/9.9
	F	296/6.8	395/8.6	186/9.1	153/11.8	74/8.1	58/17.2	1,162/9.0
Maumere (Nusatenggara)	M	302/6.6	247/11.3	206/15.0	165/24.8	111/26.1	101/31.7	1,132/16.0
	F	274/5.8	219/8.7	206/9.2	179/15.6	102/12.7	57/8.8	1,029/9.7
Salawati (Irian Jaya)	M	36/2.8	40/25.0	42/26.2	14/57.1	10/80.0	7/57.1	149/28.2
	F	26/11.5	32/25.0	22/40.9	13/53.8	11/54.5	3/66.7	107/32.7
Jakarta (Jawa)	M	243/1.2	292/4.5	117/7.7	77/3.9	47/6.4	48/2.1	821/3.9
	F	227/0.4	304/3.9	179/3.8	102/2.9	64/0.0	55/0.0	931/2.1

* Number/percent.

Table 3 Comparison of data by others on distribution and prevalence of filariasis in Indonesia and that resulting from the present survey

Islan areas surveyed	Previous reports		Present report
	No./% positive	Authors	No./% positive
Inderagiri, Sumatera		Scheepe, 1935	
Pasirbongkal	202/36.1		235/11.9
Kelayang	693/19.9		404/12.9
Morong	177/27.1		138/23.9
Martapura, Kalimantan		Kariadi, 1938	
Kampung Jawa	62/24.2		189/1.1
Tambak Anyar	88/23.9		191/9.9
Bincau	114/42.9		245/16.3
Sungai Tuan	129/38.8		215/20.9
Sulawesi		Tesch, 1937	
Pirigimpu	31/32.3		326/6.7
Masigi	40/47.5		61/21.3
Bulubete	46/78.3		123/4.9
Sidondo	46/78.3		669/34.9
Bobo	46/39.1		131/43.5
Salawati, Irian Jaya	127/26.8	Kariadi, 1937	256/30.1
Rawasari, Jakarta	196/16.3	Lie <i>et al.</i> , 1959	213/2.8
Delta Serayu, Jawa		Rodenwaldt, 1933	
Bunton	150/31.3		275/0.0
Wlahar	100/29.9		657/0.0

endemic areas for both *B. malayi* and *W. bancrofti* have been found (Joesoef and Hidayat, 1977, Joesoef and Cross, 1978) and during the past few years the significance of *B. timori* in the Lesser Sunda Islands has been recognized (Dennis *et al.*, 1976; Partono *et al.*, 1978).

Filariasis in rural areas, especially those designated for transmigrant settlements, must be controlled if economic development and advancements are to be forthcoming. Brugian filariasis is of special concern since it is more common in rural areas. The parasite matures rapidly in man and causes symptoms earlier. An excellent example of this was in the study

by Partono *et al.*, (1972). They examined both native Sulawesi and transmigrant settlements in South Sulawesi. In one transmigrant population that had lived in the area for 8 months only one person had *B. malayi* microfilaraemia and one symptom of filariases. When this same population was examined 14 months later 9 had microfilaraemia and 11 symptoms while in neighboring populations the prevalence of disease remained more or less constant.

Areas endemic for human filariasis have been identified for most of Indonesia, especially areas used in the transmigration program, and certain control measures have been attempt-

ted with moderate success. However, if national and regional economic development is to be fostered, attempts must be made to control and eventually eradicate all 3 species of parasites causing the disease. Presently diethyl-carbamazine (DEC) or hetrazan is the only effective microfilaricidal drug of value, but unfortunately side reactions often result when the drug is given initially. New drugs must be developed as soon as possible. In the meantime, however, treatment regimens presently used for DEC could be modified and older anthelmintics retested under various regimens for filaricidal activity. Furthermore, new approaches on the control of mosquito vectors in some endemic areas should be investigated. This will require in-depth studies on the bionomics of mosquito vectors and in any control program the human element or population behavior should not be overlooked. With combined treatment programs and mosquito abatement, filariasis may be controlled in some areas of Indonesia.

SUMMARY

Blood smear surveys were conducted in principal villages on the major islands of Indonesia to determine the microfilarial rates presently existing in the populations. A total of 163,454 persons were examined and 10.8 percent found positive for microfilariae of *Wuchereria bancrofti*, *Brugia malayi* or *Brugia timori*. The highest prevalence rates were found in Nusa-tenggara, Maluku, Irian Jaya (15.5%) followed by Sulawesi (13.7%) Kalimantan (10.8%) Sumatra (8.9%) Java and Bali (1.7%).

Many areas endemic for filariasis are used for the settlement of transmigrants from non-filarial endemic areas. Control programs must therefore be implemented to prevent filarial infections in these new susceptible population groups.

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