

High Prevalence of Bancroftian Filariasis in Myanmar-Migrant Workers: A Study in Mae Sot District, Tak Province, Thailand†

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Abstract

Although the prevalence of lymphatic filariasis in the Thai population is low, migration of Myanmar labor into Thailand may increase the incidence of bancroftian filariasis. Epidemiology of filariasis in Myanmar has not been precisely determined. By using microscopic examination, we found that the microfilarial rate in 654 Myanmar migrants working in Mae Sot, Tak province, was 4.4 per cent. The highest microfilarial rate was found in males aged 21-30 years (6.8%). History of mosquito bites was significantly correlated with microfilaremia. The majority of Myanmar migrants (55.5%) have been staying in Thailand 1-6 years; most (82.0%) have never been back to Myanmar. Seventy-nine per cent of infected Myanmar migrants were from Moulmein (Maulamyine) city. Since these migrants carry the parasite with high infected rate and the mosquito vector *Culex quinquefasciatus* is also prevalent in Thailand, Thai people are at high risk of acquiring this disease if good control and prevention strategies are not implemented.

Key word : Bancroftian Filariasis, Myanmar Migrant, Thailand

Lymphatic filariasis is caused by filarial nematode parasites, mainly *Wuchereria bancrofti* and *Brugia malayi*. It is estimated that 120 million persons are infected with these parasites and 1.1 billion people are at risk of acquiring infection^(1,2). The

infection begins when the third infective stage larvae enter the skin from the labium of mosquito vectors at time of blood feeding. After entering the skin, they migrate to the lymphatics and develop into adult worms. The females, after mating, will produce

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microfilariae into the blood circulation. Microfilariae will be taken by mosquito vectors during the next blood feeding. The host-parasite interactions are established that will eventually lead to the chronic infections that are associated with pathology of the disease, including lymphedema, hydrocele and elephantiasis. The disease seriously affects socio-economic status of the endemic areas.

In Thailand, lymphatic filariasis has been well controlled and endemic areas are limited to only 5 provinces: Tak, Kanchanaburi, Mae Hong Son, Surat Thani and Narathiwat, with the low prevalence rate of 3.7 per 100,000 population⁽³⁾. The strain of *W. bancrofti* among Thai people is the nocturnal sub-periodic (rural) type and the main mosquito vectors are the *Aedes niveus* group, whose habitats are in the rural areas. Recently, however, the migration of hundreds of thousands of workers from Myanmar to Thailand for better jobs and income has had a significant impact on public health of Thailand. These Myanmar migrants not only come with their labor but also with many infectious organisms. Out of many infections they carry, lymphatic filariasis needs considerable attention. Myanmar migrants are infected with *W. bancrofti*, nocturnal periodic (urban) type, which has *Culex quinquefasciatus* as the main mosquito vector. Though the number may be underestimated, the microfilarial rates among Myanmar migrants is as high as 2 per cent to 5 per cent⁽³⁾. Such a high infection rate obviously deserves Thai public health concern. Tak province is located at the Thai-Myanmar border. Tens of thousands of Myanmar migrants have migrated to work here for years. We report here the survey of microfilarial rate in the Myanmar migrants working in Mae Sot District, Tak province, Thailand.

MATERIAL AND METHOD

Study area

Mae Sot District, Tak Province, is located about 500 km northwest of Bangkok, near to the Thai-Myanmar border. Therefore, it is one of the most common places where Myanmar migrants come to work for better income.

Study population

In cooperation with local health workers and health officers from the Filariasis Division, CDC Department, the Ministry of Public Health, 654 Myanmar workers in 6 industrial plants at Mae Sot, Tak province were interviewed and examined

for microfilaremia. The interview process was performed through a translator. Verbal informed consent was obtained from each individual or child's parent or guardian. All subjects were well informed about the dangers of filariasis and the disease's consequences. Individuals who were microfilaremic were treated with standard treatment (diethylcarbamazine, DEC). Individuals who had lymphedema, elephantiasis, and/or hydrocele were classified as clinical filariasis.

Specimen collection

The "gold standard" for the diagnosis of filariasis is the identification of microfilariae in peripheral blood. Blood samples from finger-prick sterile technique were collected from 10.00-12.00 p.m. Thin- and thick-blood films were prepared from each individual, stained with Giemsa's stain, and examined under a microscope for microfilariae. Two thin- and two thick-blood films per each subject were examined by two technicians independently.

Data analysis

The results were recorded and analysed by microsoft excel version 6.0. Chi-square test was used to test significant difference of the data.

RESULTS

Characteristics of Myanmar migrants classified by age and sex

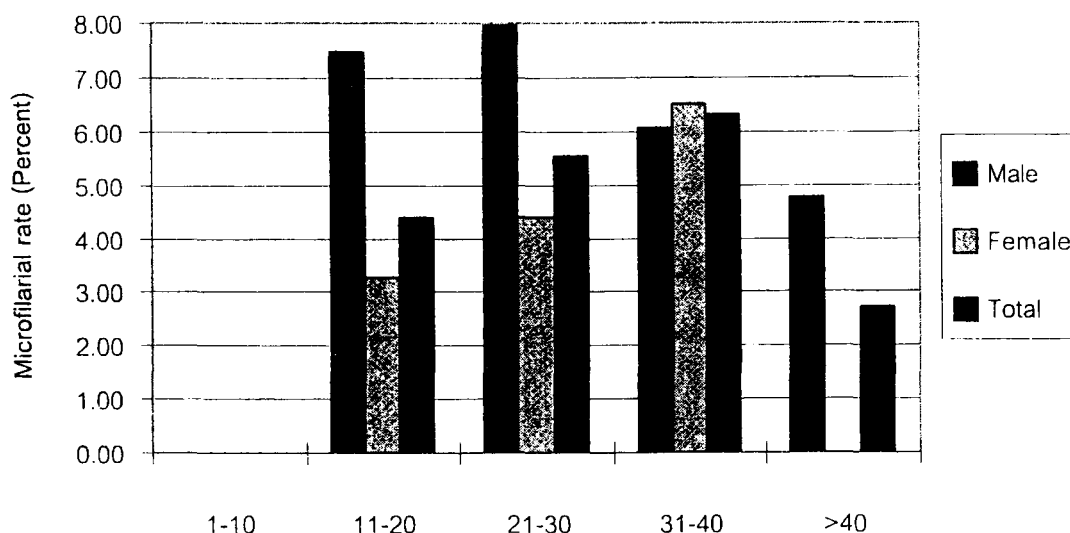
Out of the total 654 participating Myanmar migrants, 220 individuals were male and 434 were female (Table 1). The majority of these migrants were between 21-30 years (41.28%) and 11-20 years old (38.23%) (Table 1). There were 2.75 per cent, 12.08 per cent and 5.66 per cent individuals in age groups 1-10, 31-40 and more than 40 years old, respectively.

Microfilarial rates in Myanmar migrants classified by age

Microfilaremia was detected in 29 (4.4%) individuals (Fig. 1). There were 15 (6.81%) infected males and 17 (3.91%) infected females. The microfilarial rate in males was highest (7.95%) in the age group 21-30 while in females was highest (6.52%) in the age group 31-40. The microfilarial rates in males were 7.46 per cent, 6.06 per cent and 4.76 per cent in the age groups 11-20, 31-40 and >40, respectively. In females, the rates were 3.28 per cent

Table 1. Characteristics of Myanmar migrants classified by age groups.

Age group (years)	Male (number)	Female (number)	Total	%
1-10	11	7	18	2.75
11-20	67	183	250	38.23
21-30	88	182	270	41.28
31-40	33	46	79	12.08
>40	21	16	37	5.66
Total	220	434	654	100

**Fig. 1. The microfilarial rates of Myanmar migrants classified by age groups.**

and 4.40 per cent in the age groups 11-20 and 21-30, respectively. No microfilaremia was detected in children under 10 years old. The filarial parasites found in all infected cases were *Wuchereria bancrofti*, nocturnal periodic form.

History related to lymphatic filariasis

Out of the 654 Myanmar migrants, 32 (4.89%) Myanmar migrants were previously examined for microfilaremia. There were only 3 individuals who informed us that they had had microfilaremic previously. These 3 persons were treated with DEC 3 months before, and were negative for microfilaremia in our study.

History of mosquito bites was significantly associated with positive test for microfilariae ($p < 0.05$; data not shown). As expected, most of these Myanmar migrants (99.64%) did not use insect repellents or mosquito nets for prevention of mosquito bites. The places where these migrants worked and lived had human waste and waste water sources, which are good breeding grounds for mosquito vectors.

Length of stay in Thailand and number of revisits to Myanmar

The majority of these migrants (55.5%) had been staying in Thailand between 1 and 6 years, while 38.4 per cent had just come to work for less

Table 2. Length of stay in Thailand for migrant workers.

Length of stay (years)	Microfilareemics (number)	Amicrofilareemics (number)	Total	%
<1	4	247	251	38.4
1-6	14	349	363	55.5
>6	1	12	13	2.0
unknown	10	17	27	4.1
Total	29	325	654	100

Table 3. Number of revisits to Myanmar.

Number of Revisits	Microfilareemics (number)	Amicrofilareemics (number)	Total	%
Never	12	524	536	82
1-3 times	6	72	78	12
> 3 times	1	7	8	1
unknown	10	22	32	5
Total	29	625	654	100

Table 4. Permanent residence in Myanmar.

Myanmar city	Microfilareemics (number)	Amicrofilareemics (number)	Total	%
Moulmein	23	255	278	46.7
Pa-an	2	143	145	24.4
Hlaingbwe	2	51	53	8.9
Kawkareik	1	18	19	3.2
Others	1	99	100	16.8
Total	29	566	595	100

than 1 year and only 2.0 per cent stayed in Thailand more than 6 years (Table 2); there was no statistically significant difference in length of stay between the amicrofilaremic and microfilaremic individuals. Interestingly, most of the Myanmar migrants (82.0%) had never been back to Myanmar, while 12.0 per cent had been back 1-3 times (Table 3). Only 1.0 per cent of migrants had returned to Myanmar more than 3 times.

Permanent residences in Myanmar prior to working in Thailand

There were 595 (91.0%) individuals who provided information where they had stayed before

working in Thailand (Table 4). The majority (46.7%) of these Myanmar migrants were from Moulmein and 24.4 per cent from Pa-an. The others were from Hlaingbwe, Kawkareik and other cities at 8.9 per cent, 3.2 per cent and 16.8 per cent respectively. Among those who were positive for microfilariae, the majority (79.3%) were from Moulmein (Maula-myne).

DISCUSSION

Lymphatic filariasis occurs in endemic areas throughout the tropical parts of the world, with a predilection for developing countries where poor socioeconomic conditions are favorable for mos-

quito vector breeding⁽⁴⁾. The Myanmar migrants with lymphatic filariasis present within the Thai health care system deserve public health concern.

Our study showed that males had a higher microfilarial rate than females consistent with previous reports^(3,5). The microfilarial rate of Myanmar migrants in our study was highest in the age group 21-30 years (Fig. 1). The age was slightly older than those reported by the Filariasis Division⁽³⁾ and Swaddiwudhipong et al⁽⁵⁾ which showed that microfilarial rate was highest in Myanmar 15-24 years old. It is possible that more older Myanmar migrants migrated to work in Thailand, and/or those who had been working here had not returned to Myanmar.

Most infected Myanmar migrants were from Moulmein (8.27%). The rate was higher than that reported by the Filariasis Division (6.94%)⁽³⁾ and that from Swaddiwudhipong et al (6.7%)⁽⁵⁾. The infected rates of migrants from Pa-an, Kawka-reik, and Hlaingbwe were also higher in our study compared to previously reported data. This may be because we examined both thick and thin films in duplicate.

Data from the national survey of lymphatic filariasis⁽³⁾ showed that the microfilarial rate of Thai people infected with *W. bancrofti*, nocturnal subperiodic type, in Tak province was 113 per 100,000 population⁽³⁾. However, at least 2-5 per cent of Myanmar migrants working in Thailand carry *W. bancrofti*, nocturnally periodic type, which has *Culex quinquefasciatus* as the main mosquito vector⁽³⁾. It is estimated that more than one million Myanmar migrants are legally and illegally working in Thailand, including Tak province. Furthermore, *C. quinquefasciatus* is prevalent in Thailand. The major concerns are 1) hundreds of thousands of infected Myanmar migrants serve as the source of infection, 2) the unplanned growth of big cities creates waste-water breeding sources for mosquito vectors, and 3) the parasite can develop into the infective stage in *C. quinquefasciatus* in the laboratory⁽⁶⁾. Therefore, the disease has a high potential to be transmitted to the Thai population at large.

Bancroftian filariasis in most Myanmar migrants has never been treated in their country. Although they are treated with diethylcarbamazine

(DEC) in Thailand, they may revisit Myanmar and come back with the reinfection. It is clear that if Thailand does not have any control strategies for the situation, bancroftian filariasis may re-emerge as a major health problem for Thai people.

As part of the filarial control program, early detection of *W. bancrofti* in people and the potential mosquito vectors using effective methods is necessary. Using improved diagnostic methods is needed to facilitate surveillance activities, to monitor and evaluate control efforts⁽¹⁾. Field techniques should be sensitive, specific, practical, and acceptable to the people⁽⁷⁾. However, microscopic examination of microfilariae (Mf) from blood smears or filtrates is tedious and difficult to differentiate one filarial species from another⁽⁸⁾. In addition, conventional parasitological procedures fail to identify infected amicrofilaremic or individuals with very low microfilaria levels⁽⁹⁾. Besides the problems of practicality and low sensitivity, the nocturnal periodicity and subperiodicity of filariasis enhances the difficulties of parasitological detection. Therefore, to accurately estimate the true prevalence of bancroftian filariasis in these Myanmar migrants, it is necessary to use more sensitive assays with high specificity⁽¹⁰⁾.

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ความชุกสูงของพยาธิโรคเท้าช้างในแรงงานพม่า : การศึกษาใน อ. แม่สอด จ. ตาก ประเทศไทย

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แม้ว่าความชุกของโรคเท้าช้างในคนไทยจะต่ำ แต่การที่แรงงานพม่าอพยพเข้ามาทำงานอาจเป็นเหตุให้อัตราการเกิดโรคเท้าช้างที่เกิดจากเชื้อพยาธิ *Wuchereria bancrofti* สูงขึ้น ระบาดวิทยาของโรคเท้าช้างในแรงงานพม่ายังไม่ได้รับการศึกษาอย่างชัดเจน จากการศึกษาโดยการตรวจทางกล้องจุลทรรศน์ พบว่าอัตราการตรวจพบไมโครฟิลาเรียสูงถึง 4.9% ในแรงงานพม่า 654 ราย ที่ทำงานใน อ. แม่สอด จ. ตาก อัตราการตรวจพบ สูงสุดในชายอายุ 21-30 ปี (6.8%) ประวัติการถูกยุงกัดมีความสัมพันธ์อย่างมีนัยสำคัญกับการตรวจพบ ไมโครฟิลาเรียในเลือด โดยที่ 55.5% ของแรงงานพม่าอยู่ในประเทศไทยในช่วง 1-6 ปีที่ผ่านมา และ 82% ไม่เคยกลับประเทศพม่าเลย พบว่า 79% ของพม่าที่ตรวจพบไมโครฟิลาเรียมาจากเมืองเมะละแหม่ง (เมะล่าย) เนื่องจากอัตราการตรวจพบพยาธิโรคเท้าช้างในแรงงานพม่าสูง ประกอบกับยุงรำคาญ (*Culex quinquefasciatus*) พบได้ทั่วไปในบ้านเรา คนไทยจึงมีโอกาเสี่ยงสูงในการที่จะติดโรคเท้าช้าง ถ้าขาดมาตรการควบคุมและป้องกันที่เหมาะสม

คำสำคัญ : โรคเท้าช้าง, แรงงานพม่า, ประเทศไทย

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