PARASITIC INFECTIONS AMONG KAREN IN KANCHANABURI PROVINCE, WESTERN THAILAND

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Abstract. The purpose of this study was to determine the rate of intestinal parasitic and malarial infections during a period of low infection among the residents of remote Karen villages in Thailand. Fifty-five males and 64 females, aged 6 months to 70 years, were examined for malaria by thick blood smears using the Giemsa staining technique. Of the 119 subjects, 4 (3.36%) showed positive for malaria with vivax gametocytes. Results suggested that mass screening was not an effective way for diagnosing malaria. Stool samples were examined under a light microscope. The overall intestinal parasitic infection rates were 38.24% in 34 males, and 36.11% in 36 females. These were hookworm (17.14%), *Ascaris lumbricoides* (7.14%), *Trichuris trichiura* (1.43%), *Strongyloides stercoralis* (7.14%), *Taenia* spp (1.43%), *Entamoeba histolytica* (1.43%), *Entamaeba coli* (10.00%) and *Giatdia lamblia* (1.43 %). The highest (55.55%) and lowest (16.66%) rates of infection were observed in age groups 0-5 and over 45, years respectively. In addition, *A. lumbricoides* and *T. trichiura* were found more frequently in children, while hookworms was found similarly in every age group. Results showed that the Karen living along the western border of Thailand possessed high rates of intestinal parasitic infections. Strict monitoring and control programs for these parasites should be implemented.

INTRODUCTION

Intestinal parasitic infection, a common tropical disease, has been an important problem in public health. The main intestinal parasitic infections are comprised of five species of soil-transmitted helminthes, namely *Ascaris lumbricoides, Ancylostoma duodenale, Necator americanus, Trichuris trichiura* and *Strongyloides stercoralis*. Infections with the first four species are highly prevalent in many regions of the world and they cause the tenth most common infections affecting the world's population. Helminthiasis is a disease commonly found in Thailand. The prevalence and distribution of the infection in any area depend upon several factors such as the customs, beliefs and behavior of people, intermediate hosts, temperature, humidity and geography of the area (Tesana *et al*, 1987). This is clearly seen in the northeastern and southern parts of Thailand, where opisthorchiasis and soil-transmitted helminthiasis are prevalent, respectively. Soil-transmitted helminthes or geo-helminthes are of great importance in the health sector in developing countries with poor socio-environmental conditions. It is estimated that some 3.5 billion people are infected with helminthes (Chan, 1997). In the southern region of Thailand, high humidity and appropriate temperatures throughout the year, together with agricultural occupations and the lack of hygiene of most people, *ie*, defecating on the ground outside latrines, wearing no shoes and eating contaminated fresh vegetables, help to promote helminthic infections (Muennoo *et al*, 1988).

In Thailand, surveys and campaigns to prevent and control these helminthiases are still continuously conducted. In 1982, the prevalence of helminthic infections in Thai people was 54.6%. This includes 36.0% in the central, 41.1% in the northern, 66.2% in the northeastern and 87.4% in the southern parts (Preusaraj *et al*, 1982) while in 1987, the prevalences were 60.5%, 39.6%, 52.8%, 60.0% and 89.8%, respectively (Vajrasthira and Harinasuta, 1987). In 1990, the overall prevalence (87.4%) of helminthic infection in seven provinces of southern of Thailand was reported (Dulyapiree, 1989). In 1992, Muennoo *et al* (1993) studied the prevalence and intensity of soil-transmitted helminthiasis in primary school children in Nakhon Si Thammarat and reported an overall prevalence of 87.0%. The same authors also

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found that the reinfection rate of the disease, eight months after complete cure, were 82% for hookworm, 78.8% for *Trichuris* and 63.3% for *Ascaris* infections (Muennoo *et al*, 1993). Based on the above reports, the prevalence of the infections in some areas did not decrease. Therefore, base-line information should be available before any control program is conducted. The current study was undertaken to assess the parasitic infections in Karen living in Kanchanaburi Province.

MATERIALS AND METHODS

Specimens collection

This study was conducted in April 2002 in two Karen villages (Moo 5 and Moo 8) of Veerkradi Subdistrict, Sangkhla Buri, Kanchanaburi Province, 500 km west of Bangkok. The socioeconomic status of both villages was poor. The investigators, together with local health department officials, visited the two Karen villages located near the western border of Thailand. The officials, communicating in the local dialect, explained why blood and stool samples were collected, and that anyone found infected with either malaria or intestinal parasites would receive free medical treatment. A total of 119 (55 males, 64 females) subjects were examined for malaria and 70 (34 males, 36 females) were examined for other parasitic infections (helminthes and protozoa).

Stool examination

Stool samples were prepared by simple smear technique. Helminth eggs and protozoa were observed under light microscopes with a x40 objective lens.

Malaria diagnosis

Blood slides (thick film) were prepared by finger-prick, air dried and examined after Giemsa staining by an oil immersion light microscope. The same procedures were applied for slides obtained from the health center and community survey.

RESULTS

The malaria infection rate in this study was 3.36% (4/119) (Table 1). It was found in three males and one female aged less than 10 years. Malaria was not found in other age groups. In the thick blood smears, *P. vivax* gametocytes were observed.

The prevalence of parasitic infection was 37.14% (33/70); 38.24% (13/34) in males and 36.11% (13/36) in females. These were *Ascaris lumbricoides* (7.14%), *Trichuris trichiura.* (1.43%), hookworm (17.14%), *Strongyloides stercoralis.* (7.14%), *Taenia* spp (1.43%), *Entamoeba histolytica* (1.43%), *Entamoeba coli* (10.00%), and *Giardia lamblia* (1.43%). The highest (55.55%) and lowest (16.66%) rates of infection were observed in the age groups 0-5 and >45 years, respectively (Table 2). Table 3 shows the numbers of villagers in different age groups infected with different types of parasites. The older the subjects the lower rates of infection observed.

DISCUSSION

The study revealed a malaria infection rate of 3.36% and a parasitic infection rate of 47.14% among Karen villagers. All the *P. vivax* malaria-infected people were young (1-10 years of age). The majority of the parasitic infections was observed in 6-10 year old villagers. Five species of helminthes and three species of protozoa were detected. Intestinal helminth infections among Karen villagers were characterized by a high prevalence of soil-transmitted nematodes. The prevalence of hookworm was the highest among the helminthes, followed by *A. lumbricoides* and *T. trichiura* while *E. coli* was the highest among the protozoa. *E. histolytica* (1) and *G. lamblia* (1) were found in the older age group (31 to >45 years old). No trematode infections were observed. This is similer to findings in most areas of Thailand.

Table 1
Number and percentage of malaria-infected villagers in Karen villages, Kanchanaburi.

Villages	No. infected/No. tested (%)		Total infected/ examined (%)
	Male	Female	
Moo 5	1/40 (2.50)	1/56 (1.79)	2/96 (2.08)
Moo 8	2/15 (13.33)	0/8 (0)	2/23 (8.70)
Total	3/55 (5.45)	1/64 (1.56)	4/119 (3.36)

Table 2
Numbers and percentage of villagers infected with various types of intestinal parasites.

Parasites	No. infected/No. tested (%)		Total No. infected/No. tested (%)
	Male	Female	
Helminthes			
A. lumbricoides	3/34 (8.82)	2/36 (5.55)	5/70 (7.14)
T. trichiura	1/34 (2.94)	0/36 (0)	1/70 (1.43)
Hookworm	6/34 (17.64)	6/36 (16.66)	12/70 (17.14)
S. stercoralis	5/34 (14.70)	0/36 (0)	5/70 (7.14)
Taenia spp	1/34 (2.94)	0/36 (0)	1/70 (1.43)
Protozoa			
E. histolytica	0/34 (0)	1/36 (2.77)	1/70 (1.43)
E. coli	1/34 (2.94)	6/36 (16.66)	7/70 (10.00)
G. lamblia	1/34 (2.94)	0/36 (0)	1/70 (1.43)
Total	13/34 (38.24)	13/36 (36.11)	33/70 (47.14)

Table 3
Number of villagers in different age groups infected with intestinal parasites .

Parasites	Age groups(years)						Total
	1 - 5	6 - 10	11 - 20	21 - 30	31 - 45	> 45	
Helminthes							
A. lumbricoides	1	3	0	1	0	0	5
T. trichiura	0	1	0	0	0	0	1
Hookworm	2	3	3	2	2	0	12
S. stercoralis	2	1	0	1	1	0	5
Taenia spp	0	0	0	0	1	0	1
Protozoa							
E. histolytica	0	0	0	0	1	0	1
E. coli	1	2	2	0	2	0	7
G. lamblia	0	0	0	0	0	1	1
Total found(%)	6 (66.66%)	10 (62.5%)	5 (45.45%)	4 (36.36%)	7 (41.17%)	1 (16.66%)	33
Total examined	9	16	11	11	17	6	70

Although the Ministry of Public Health hookworm control program has been implemented continuously, the disease is still widely distributed. This is because most of the people have not changed their habit of defecating outside latrines and not wearing shoes outside the house. People should, therefore, be educated how to protect themselves against helminth infections rather than treating themselves with drugs after infection. They should also have a chance to participate in the prevention and control program in their own communities, otherwise the program will not be successful.

Aside from these epidemiologic data, information about the correlation of demographics/symptoms and helminth infections may help target screening and treatment of helminth infections in this population. Follow-up analysis of this population could help track the effectiveness of health education in the prevention of helminth infections. The Health Department of Ministry of Public Health, Thailand, has identified a number of ways to reduce helminth infections. These efforts emphasize education about personal hygiene, such as hand-washing, cleaning clothes and the proper

sanitation of human waste. Other measures include proper dietary habits, like cooking food, boiling water and wearing footwear. Further study should evaluate the correlation of these risk factors and clinical symptoms with helminth infections. Follow-up evaluations could measure the effectiveness of health education by the Department of Health in the prevention of helminth infections. Helminthiasis can be easily diagnosed with a fecal sample and can be treated by oral administration of antihelmintics. It can be performed intensively as an ordinary public health care activity.

Malaria is still one of the important infectious diseases in Thailand, despite decades of successful control programs and dramatic reductions in morbidity and mortality. While deforestation has pushed malaria out of many regions of Thailand, it remains most prevalent along the borders of Thailand and Myanmar, Cambodia, and Malaysia. In our study, only 4 (3.36%) out of 119 subject were positive for *P. vivax* which suggested that mass screening was not an effective way for diagnosing malaria.

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