

## Brief communication

# Worm treatment program in “Long Neck” hill tribes

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**Background:** Helminth infection is a worldwide problem and prevalent in low income areas. The costs for prevention, treatment and eradication have so far frustrated budgets of global public health systems.

**Objective:** The present study was to determine the epidemiologic characteristics of worm infections in two “Long Neck” hill tribe villages in Mae Hong Son Province of Thailand. We evaluated how epidemiologic characteristics of infection could be used for control and eradication in a cost effective manner.

**Materials and methods:** In January 2002, investigators visited two “long neck” villages. The team explained the purpose of the study and how to collect specimens in the Karen language. The population in the two villages was 300 in 2002.

**Results:** Stool samples were collected from 133 subjects (age range: 1 to 67 years old), 54.1 % (72/133) of the subjects were female. The parasites rate was 11 % (15/133). Parasites included 8 cases of *Trichuris trichiura* and 6 cases of hookworm.

**Conclusion:** Most infections (69 %) occurred in the 21-30 age-group. By using the present data, the Provincial Health Office in Mae Hong Son conducted mass treatment and was able to target high risk individuals.

**Keywords:** Helminth, Karen long neck, *Trichuris trichiura*, villagers.

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Intestinal parasitic infection is a serious public health problem among inhabitants of developing countries. Helminthiasis can be easily diagnosed using stool examination and are treatable by oral administration of anthelmintics. It can be performed intensively as an ordinary public health activity. Hundreds of millions of people are infected mainly in developing countries with soil-transmitted helminthes (STH) with a significant morbidity and mortality [1, 2]. Helminthiasis is commonly found in Thailand. The prevalence and distribution of the infection in any area depends upon several factors such as customs, beliefs and behavior of people, pressure of intermediate hosts of parasites, temperature, humidity and geography of the area [3]. This is clearly seen in the northeastern and southern parts of Thailand where

opisthorchiasis and soil-transmitted helminthiasis are prevalent. In the southern region, there is high humidity and appropriate temperature during the whole year together with agricultural occupation of most of the people. Feces are deposited on the ground outside latrines, and people do not wear shoes and have the habit of the eating fresh vegetables that have been fertilized with feces [4]. In 1987, the prevalence of parasite infection in each region was 60.5 %, 39.6 %, 52.8 %, 60.0 %, and 89.8 % respectively [5]. In 1990, the overall prevalence of the infection in seven provinces in the south of Thailand was 87.4 % [6]. Muennoo *et al* [7] 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 found that the reinfection rates of the disease eight months after a complete cure was 82 % for hookworm, 78.8 % for *Trichuris* and 63.3 % for *Ascaris* infections. Base line information is always important before any control program is conducted.

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No researcher has evaluated the epidemiology of helminthes infections in the “long neck” Karen tribe who live in Mae Hong Son Province. This study undertook an assessment of parasitic infection and started the first large scale worm treatment program in “long neck” hill tribes living in Mae Hong Son province of Thailand.

### Materials and methods

This study was conducted in January 2002 in two “long neck” villages (Nai Soi and Huai Saw Taw) in Mae Hong Son Province, 750 km from Bangkok, Thailand (**Fig. 1**). The socioeconomic situation in both villages was poor, i.e. houses were made of wood and bamboo. The main occupation of villagers is making souvenirs. The team explained the purpose of the study and how to collect specimens to the villagers in the Karen language. The total estimated population

in Nai Soi village and Huai Saw Taw village was 300. The ages of subjects ranged from 1 to 67 years. Stool samples were collected from 133 villagers who gave their consent. Samples were then prepared using the Formalin-ether concentration technique and examined using a light microscope with a x40 lens.

### Results

The total stools examined was 133 (100 %), 61 (45.9 %) were from males and 72 (54.1 %) from females (**Table 1**).

The prevalence of helminthiasis was 11.3 %, 11.5 % in males and 11.1 % in females (**Table 2**). A breakdown of the rates of the different types of parasitic infection is as follows: *Trichuris trichiura*. (6.0 %), hook worm (4.5 %) and *Entamoeba coli*. (1.5 %). The highest rate (39.1%) of infection was observed in the age group of 21-30 years (**Table 3**).



**Fig. 1** “Long-neck” hill tribes living in Mae Hong Son province.

**Table 1.** Demographic information.

Characteristics		Number (%)
<b>Examined</b>		133 (100)
<b>Sex</b>	Male	61 (45.9)
	Female	72 (54.1)
<b>Age</b>	1-10	28 (21.1)
	11-20	23 (17.3)
	21-30	23 (17.3)
	31-60	23 (17.3)
	> 60	2 (1.5)
	unknown	34 (25.6)

**Table 2.** Infection rate of helminthiasis in Karen “long neck” villages.

	Male		Female		Total	
	Examined Cases	Infected Cases (%)	Examined Cases	Infected Cases (%)	Examined Cases	Infected Cases (%)
<i>Nai Soi village</i>	25	2 (8.0)	28	3 (10.7)	53	5 (9.4)
<i>Huai Saw Taw village</i>	36	5 (13.9)	44	5 (11.4)	80	10 (12.5)
<b>Total</b>	61	7 (11.5)	72	8 (11.1)	133	15 (11.3)

**Table 3.** Infection rates and levels of infection by respondents’ characteristics.

Factors		Examined Cases	Total Infected Cases (%)	<i>E. coli</i> - infection Cases (%)	<i>Trichuris</i> <i>trichiura</i> -infection Cases (%)	Hookworm- infection Cases (%)
<i>Sex</i>	Male	61	7 (11.5)	1 (0.8)	3 (2.3)	3 (2.3)
	Female	72	8 (11.1)	1 (0.8)	5 (3.8)	3 (2.3)
<i>Age</i>	1-10	28	0 (0)	0 (0)	0 (0)	0 (0)
	11-20	23	4 (17.4)	1 (0.8)	2 (1.5)	1 (0.8)
	21-30	23	9 (39.1)	0 (0)	6 (4.5)*	4 (3.0)*
	31-60	23	0 (0)	0 (0)	0 (0)	0 (0)
	>60	2	0 (0)	0 (0)	0 (0)	0 (0)
	Unknown	34	2 (5.9)	1 (0.8)	0 (0)	1 (0.8)
	<b>Total</b>	133	15 (11.3)	2 (1.5)	8 (6.0)	6 (4.5)

\*Double infections (*Trichuris trichiura* and Hook worm).

## Discussion

This study is the first report of parasitic infection in Karen long neck villages. The present study reveals a parasitic infection rate of 11.0 % among the “long neck” population. The majority of infection was in ages from 11-30 years. The highest infection rate (69 %) occurred in the 21-30 age-group. One species of protozoa; *E. coli* was detected. *E. coli* can be mistaken for pathogenesis *E. histolytica* by an inexperienced microscopist. When the organisms are stained, the nuclear morphology is distinct. Peripheral chromatin in *E. coli* is irregular in size and in its arrangement on the nuclear membrane. It is more abundant than with *E. histolytica*. The cysts of *E. coli* overlap in size range with *E. histolytica*, being 10 to 35 µm in diameter. The average diameter is greater than in cysts of the pathogenic *E. histolytica* species. The cyst wall is highly refractile and cytoplasm granular in appearance. The nuclei are usually readily observed; they vary in number from one to eight. The eccentric position of the karyosome can be seen, even in unstained amebae. Chromatoidal bodies are less common than in *E. histolytica* but occasionally may be observed as clear, thin lines or

rods of refractile material in the cytoplasm. Only two different species of parasites have been detected in the Karen “long neck” village: *Trichuris trichiura* and hookworm. One case of a double infection was also found in this study in a 21-30 years old female. The infection in Karen long neck villagers is characterized by the high prevalence of soil-transmitted nematodes. The prevalence of *Trichuris trichiura* infection was highest, followed by hookworm; no cestode and trematode infections were observed. This finding was similar to other studies in Thailand [3, 8]. The infection rates may be influenced by the climate, socioeconomic status, and eating habits [3]. Warm and humid climates tend to generate a relatively large number of infections. In rural areas, sanitation and economic conditions also lead to an increase parasite infection rate. Poverty-stricken areas in which there is a shortage of shoes, poor water supply, and poor drainage systems cause the local residents to be more susceptible to various types of intestinal helminthes. This, however, is speculation, as we have no hard data supporting these observations. Factors influencing the infection rate may include personal hygiene, levels of parental care, social interactions at

school, and teacher knowledge of and attention to hygiene e.g. cooked food, hand washing and bathing. These concerns might be addressed in the future. This data may be useful to develop programs for the prevention and control of worm infection and thus decrease the prevalence of helminthiasis.

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