



# Intestinal Helminthiases in Two Communities of Phitsanulok Province, Northern Thailand

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## Abstract

Most serious helminthic infections occur in tropical regions, particularly in lesser-developed countries, including outreach rural communities in Thailand. This study investigated the prevalence of helminthic infections in the people of Ban Chat Trakan Village in Chat Trakan District, and Ban Mung Village, Noen Maprang District, Phitsanulok Province, in northern Thailand. The formalin ethyl acetate concentration technique was used to detect parasites in fecal samples. In total, 286 people were recruited for this study: 153 from Ban Mung Village and 133 from Ban Chat Trakan. The percentage of helminthic infections in both communities was low, with an overall infection rate of 5.6%; which comprised 2.4% *Strongyloides stercoralis*, 1.6% hookworm, and 0.8% *Taenia* spp and *Hymenolepis nana*. In addition, the 'Scotch tape' method was used to recover pinworm (*Enterobius vermicularis*) eggs, giving an overall enterobiasis infection rate of 10.5%. All positive cases were treated with an anthelmintic drug. Health-education campaigns for the prevention of helminthic infections, and selective treatment, are needed for these two communities.

**Keywords:** prevalence, intestinal helminthiasis, Phitsanulok, Thailand

## Introduction

In 2000, the WHO reported that about 3.5 billion people were infected with intestinal parasites, and around 450 million children were ill because of these infections worldwide [1]. There are an estimated 280 million people infected with hookworm, 478 million with ascariasis, and 347 million with trichuriasis [2]. Children and pregnant women are particularly vulnerable to infection, causing many nutritional problems, resulting in growth retardation. The public-health

problems caused by helminthic infections have been neglected in rural areas where there remains a lack of hygiene and an inadequate supply of sanitary water. However, recent research has shown that intestinal helminthic infections can produce various types of morbidity, such as bloody stool, chronic diarrhea, and abdominal pain [3]. Intestinal helminthic infections are the most common human parasitic infections, especially in rural areas of Thailand [4,5]. The objective of this research was to study the infection rate of intestinal helminths within two communities in Phitsanulok Province. A small amount of existing data on intestinal helminthic infections among people in Phitsanulok has been reported [6,7]. Ban

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Chat Trakan Village in Chat Trakarn District and Ban Mung in Noen Maprang District, Phitsanulok Province, were selected for a survey of intestinal helminths. The results of this study will be useful for researchers and health authorities for planning and implementing control programs for intestinal helminth infections in the area.

## Materials and methods

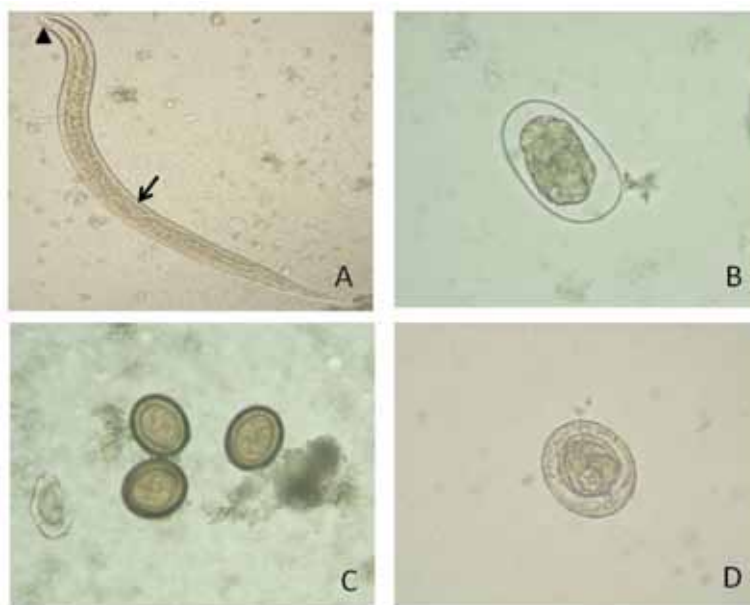
The Faculty of Medical Science, Naresuan University, dispatched a mobile team to provide medical services to Ban Chat Trakan Village in Chat Trakan District, and Ban Mung Village, in Noen Maprang District, Phitsanulok Province, in January 2011. All of the people who attended the mobile clinic were included in this study. Preliminary diagnoses of stool samples were done by simple smear technique. All fecal samples were fixed with 10% formalin and transported to the laboratory of the Department of Microbiology and Parasitology, Faculty of Medical Science, Naresuan University, to confirm infections by formalin-ethyl-acetate sedimentation technique [8]. The sediments were examined for protozoa, eggs, and larvae of

intestinal helminthes under a light microscope.

In addition, the Scotch-tape technique was used to find pinworm, *Enterobius vermicularis*, eggs. The children were instructed how to use the cellophane-tape slides, as described by Beaver *et al* [9]. All positive cases were treated with anthelmintic drugs and were educated about parasitic transmission and prevention.

## Results

A total of 124 fecal samples were collected to check for parasites; 42 samples were collected in Ban Mung Village and 82 samples in Ban Chat Trakan. It was found that the prevalence of intestinal helminthic infections among people in both communities was low, with an overall infection rate of only 5.6%. This comprised 2.4% *Strongyloides stercoralis* (Fig 1A), 1.6% hookworm (Fig 1B), 0.8% *Taenia* spp (Fig 1C), and 0.8% *Hymenolepis nana* (Fig 1D). In Ban Chat Trakan Village, the overall infection rate was 7.3% (6/82), and only 2.3% (1/42) in Ban Mung (Table 1). One fecal sample from a woman in Ban Mung Village was positive for a *Giardia lamblia* cyst.



**Fig 1 Parasites collected from stool samples: rhabditiform larva of *Strongyloides stercoralis* (A) showing short buccal cavity (arrowed head) and prominent genital primordium (arrow), egg of hookworm (B), eggs of *Taenia* sp (C), and egg of *Hymenolepis nana* (D).**

**Table 1 Prevalence of human intestinal helminthiases in Ban Mung and Ban Chat Trakan villages, Phitsanulok Province (examined by formalin ethyl acetate concentration technique).**

Location	No. examined	No. positive (%)	No. infected (%)			
			<i>Hookworm</i>	<i>Strongyloides stercoralis</i>	<i>Taenia sp</i>	<i>Hymenolepis nana</i>
Ban Mung	42	1 (2.3)	0	1 (2.3)	0	0
Ban Chat Trakan	82	6 (7.3)	2 (2.4)	2 (2.4)	1 (1.2)	1 (1.2)
Total	124	7 (5.6)	2 (1.6)	3 (2.4)	1 (0.8)	1 (0.8)

**Table 2 Prevalence of enterobiasis in Ban Mung and Ban Chat Trakan villages, Phitsanulok Province (examined by Scotch-tape technique).**

Location	No. Positive/No. examined (%)		
	Boy	Girl	Total
Ban Mung	8/53 (15.09)	4/58 (6.89)	12/111 (10.81)
Ban Chat Trakan	3/27 (11.11)	2/24 (8.33)	5/51 (9.80)
Total	11/80 (13.75)	6/82 (7.31)	17/162 (10.49)

In addition, 111 children from Ban Mung and 51 from Ban Chat Trakan Village were examined by Scotch-tape method. The overall infection rate for pinworm eggs was 10.5% (Table 2). All positive cases were treated with a single 100 mg dose of mebendazole.

## Discussion

Our study showed that the overall prevalence of intestinal helminthiases was low in both communities, with only 2.3% in Ban Mung Village and 7.3% in Ban Chat Trakan. *S. stercoralis* was the most prevalent (2.4%), followed by hookworm (1.6%), with *Taenia* spp and *H. nana* being the least prevalent (0.8%). *S. stercoralis* and hookworm are soil-transmitted helminths, and they were the most frequently detected helminth parasites in the present study. This is consistent with several studies at various sites in Thailand [5,10-18]. In contrast with the previous research carried out in Sai Dong Young Village, Wang Yang Subdistrict and Huay Bo Tong Village, Ban Mung Subdistrict,

Noen Maprang District, they demonstrated higher prevalence of *S. stercoralis* (9.58%) and hookworm infection (8.22%) [6]. The low prevalence of intestinal helminthiases in this study may be due to improvements in general living conditions and access to healthcare services. However, despite the low prevalence of parasitic infection demonstrated in this study, a good management system focusing on control and prevention is necessary to prevent the transmission of parasites. The presence of *H. nana* was unexpected, since it is a rare cestode infection of humans.

The overall infection rate for enterobiasis was 10.49% for both communities. Our result was similar to other findings among children in Thailand: 15.5% in Mae Chaem, Chiang Mai [18], 21.5% in Bang Khun Thian, Bangkok [19], 21.91% in Bangkok and surrounding areas [20], and 18.7% in Phichit Province [21]. Like the report by Bunchu *et al*, they showed high prevalence (25.0%) of enterobiasis in children from 5 districts (Chat Trakan, Nakhon Thai, Noen Maprang, Wat

Bot, and Wang Thong) in Phitsanulok [22]. These reports demonstrate an overall low prevalence of enterobiasis in Thailand, although a high prevalence of this infection (41.6%) was found among children in Mae Suk Sub-district and among Karen hilltribe villages in Chiang Mai Province [23]. In the present study, pinworm eggs had a rather low prevalence, as well. This may be due to the single test using the cellophane tape technique. It is suggested that the test be repeated to yield 90% 3 times and 99% 5 times [24].

In conclusion, although the percentage of intestinal parasitic infections in Ban Mung Village and Ban Chat Trakan Village was low, the need for infection control is recommended to prevent parasite transmission.

## Acknowledgements

This research was supported by the Academic Service Division of Naresuan University. We would like to thank staff in the Department of Microbiology and Parasitology, Faculty of Medical Science, for their technical support. We would also like to thank Mr Matthew Ferguson for providing English language editing support for this manuscript.

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