

# ENTEROBIUS VERMICULARIS INFECTION AMONG PRE-SCHOOL CHILDREN IN KAREN HILLTRIBE VILLAGES IN CHIANG MAI, THAILAND

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**Abstract.** We surveyed Karen hilltribe villages in the Mae Chaem District of Chiang Mai Province between April and May 2001. Two hundred and forty-nine pre-school children were selected by stratified sampling from 10 villages and were examined for *Enterobius vermicularis* eggs by the Scotch tape perianal examination technique. One hundred and thirteen (53 boys and 60 girls) were found to have *E. vermicularis* eggs, giving an overall infection rate of 45.38%. We were able to determine that *E. vermicularis* infection is prevalent among the children of these hilltribe villages.

## INTRODUCTION

*Enterobius vermicularis* is an important helminthic infection among children in the rural areas of developing countries (Devera *et al*, 1998; Fan, 1998, Lee *et al*, 2000). Enterobiasis is frequently asymptomatic. The commonest symptom is perianal pruritus, especially at night, which may lead to excoriation and bacterial superinfection (Finn, 1996; Grecnis and Cooper, 1996). Occasionally, invasion of the female genital tract, followed by vulvovaginitis and pelvic or peritoneal granulomas occurs.

A high prevalence of enterobiasis can be found among the children of families of low socioeconomic status. This infection affects both the general health and the intellectual development of children (Bahader *et al*, 1995; Avolio *et al*, 1998). A high prevalence of enterobiasis is a feature of many developing countries and, therefore, control of this infection remains important. We report on the very high prevalence of enterobiasis among the pre-school children of hilltribes in rural in rural Thailand.

## MATERIALS AND METHODS

### Study area and participants

We studied Karen hilltribe villages in Mae Chaem district, Chiang Mai Province, between April, and May 2001. Two hundred and forty-nine pre-school children were selected stratified sampling from 10 villages. The province is situated some 800km from Bangkok.

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In cooperation with local health workers, we dealt directly with the community leaders, who assisted us in maximizing community participation. A Thai-Karen translator was used. Verbal informed consent was obtained from each child's parents.

### Examination for enterobiasis

Specimen collection was performed by well-trained health personnel. *Enterobius vermicularis* eggs were collected by applying Scotch tape to the perianal region; specimens were collected at the subject' home at between 06.00 and 08.00 hours. The specimens were sent for identification by light microscopy in the laboratory of Mae Chaem Hospital. The study was approved by the Academic Committee of the Faculty of Allied Health Science, Chulalongkorn University.

## RESULTS

All 249 pre-school children were examined. One hundred and thirteen (53 boys and 60 girls; age range 1-12 years old) were found to be positive for *E. vermicularis* eggs: an overall infection rate of 45.5% (Table 1).

## DISCUSSION

Pinworm infection (enterobiasis) is caused by the nematode *Enterobius vermicularis*. Humans are the only hosts of *E. vermicularis*. Adult worms live in the lumen of the colon; gravid females migrate nocturnally outside the anus and oviposit while crawling on the perianal skin. The larvae contained inside the eggs become infective after 4 hours, under optimal conditions. Auto-infection occurs by the transfer of

Table 1  
*Enterobius vermicularis* infection in pre-school children.

Pre-school children	No. positive (%)	No. negative (%)	Total
Male	53 (47.8)	58 (52.2)	111
Female	60 (43.5)	78 (56.5)	138
Total	113 (45.5)	136 (54.6)	249

Table 2  
The prevalence of enterobiasis in pre-school children: a summary of recent reports.

Study	Setting	Prevalence
Fan (1998)	Taiwan	14.0 %
Devera <i>et al</i> (1998)	Ciudad Bolivar, Venezuela	19.1 %
Lee <i>et al</i> (2000)	Tangjin-gun, Chungchongnam-do, Korea	14.8 %
Current study	Mae Chaem, Chiang Mai, Thailand	45.4 %

infective eggs from hands, contaminated by scratching the perianal region, to the mouth. Person-to-person transmission can also occur through the handling of contaminated clothes or bed linen (Finn, 1996; Grecnis and Cooper, 1996).

Infections are more common among school- and pre-school children and in crowded conditions. In order to control this infection, parental education, screening for infection, and the distribution of pyrantel pamoate which interrupts the worm's life cycle, are warranted.

In this survey, we were able to determine that *E. vermicularis* is prevalent among children in hilltribe villages; the rate of infection was high (45.38 %). Although our technique, the Scotch test, has a lower sensitivity than perianal swabbing, the infection rate found in our study was greater than those found by many other researcher (Devera *et al*, 1998; Fan, 1998, Lee *et al*, 2000) (Table 2).

Enterobiasis is an important infectious disease in the environment in which our study was conducted. On the basis of our finding, we plan to launch a control program in the community which will include distribution of pyrantel pamoate and a follow-up to review its effectiveness.

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