

EGG POSITIVE RATE OF *ENTEROBIUS VERMICULARIS* IN CHILDREN IN A RURAL AREA OF PHICHIT PROVINCE, THAILAND

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Abstract. The pinworm *Enterobius vermicularis* is a cause of enterobiasis or oxyuriasis that causes anal itching and enuresis among school-age children, and genital inflammation and irritation in women and girls. The objective of this study was to determine the egg positive rate of pinworm infection in students of a rural area in Phichit Province, from January to December 2005. Cellophane tape method was used to identify the infection of pinworm. Of 298 students examined, 56 (18.7%) were found positive for pinworm eggs. The rate of boys (19.0%) found positive for pinworm was nearly as high as that of girls (18.5%). The results of the present study indicated that pinworm infection was highly prevalent, and there is a need to control it in the study area.

INTRODUCTION

The pinworm, *Enterobius vermicularis*, is one of the most common parasites of man, particularly in schoolchildren. It is characterized by an esophagus with a posterior bulb. The worms are most abundant in the cecum and appendix. Humans are generally thought to be the only host, but these worms have been reported in a few other primates, for example, chimpanzees and gibbons (Noble *et al*, 1989). The nocturnal migration of the female worm to the host's anus to lay eggs frequently leads to severe irritation. Most cases are asymptomatic. However, anal or vaginal pruritus, abdominal pain, constipation, or diarrhea can occur. Children are more commonly infected than adults are, presumably because they are less fastidious in matters of personal hygiene (Paingjai *et al*, 1992).

Phichit is situated in the northern region of Thailand and is located 345kms to the north of Bangkok. The number of inhabitant of Phichit was 559,000 in 1992. The provincial economy is based on agriculture. The important economic crops are rice, corn, green pea, and various kinds of tropical fruit.

The objective of this study was to determine the egg positive rate of pinworm infection in students of a rural area of Phichit Province, from January to December 2005.

MATERIALS AND METHODS

A survey of *Enterobius vermicularis* was carried out in six districts (Tap Khlo, Dong Charoen, Taphan Hin, Sam Ngam, Pho Thale, and Bueng Na Rang) in Phichit. The 290 children in these areas, age 1-12 years, who were recruited for this study, had verbal informed consent from their parents. The children were clarified for using cellophane tape, as described by Beaver *et al* (1984). The results were analyzed with respect to gender using the chi-square test.

RESULTS

A total of 56 (18.8%) of the 298 samples were positive for pinworm egg. The egg positive rate ranged from 0% to 33.3%, by location (Table 1). The egg positive rate among boys (19.0%) was not significantly different to that of girls (18.5%).

DISCUSSION

The overall infection rate was 18.8% (56/298), in which the egg positive among boys (19.0%) was not significantly different to that among girls (18.5%). Three hundred seven

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Table 1
Egg positive rates of *Enterobius vermicularis* among children living in Phichit

District	Boys No. positive/ No. examined (%)	Girls No. positive/ No. examined (%)	Total No. positive/ No. examined (%)
Tap Khlo	7/30 (23.3)	7/40 (17.5)	14/70 (20)
Dong Charoen	4/30 (13.3)	3/26 (11.5)	7/56 (12.5)
Taphan Hin	0/15 (0)	4/16 (25)	4/31 (12.9)
Sam Ngam	10/31 (32.3)	7/20 (35)	17/51 (33.3)
Pho Thale	0/14 (0)	0/8 (0)	0/22 (0)
Bueng Na Rang	10/43 (23.3)	4/25 (16)	14/68 (20.6)
Total	31/163 (19.0)	25/135 (18.5)	56/298 (18.8)

(18.5%) of the 1,661 samples were positive for *E. vermicularis* eggs. The results of the present study were similar to other findings in Thailand. Using the same method, other studies found that the infection rates were 15.5% and 21.5%, in Mae Chaem, Chiang Mai and Bang Khun Thian, Bangkok, respectively (Saksirisampant *et al*, 2004; Changsab *et al*, 2000). High prevalence of 41.6 % was found in hill tribe children Mae Suk Sub-district and Karen hill tribe villages in Chiang Mai (Chaisalee *et al*, 2004). In the Republic of Korea, the egg positive rate ranged from 0% to 59.3% by location on western and southern coastal regions (Park *et al*, 2005).

The prevalence of enterobiasis greatly depends upon the socioeconomic situation, and on personal hygiene and habits. A lack of personal hygiene and close contact between people encourage the spread of *E. vermicularis*. Other factors, such as playing on the floor, nail biting, failure to wash hand before meals, and living in non-apartment dwellings, have been associated with the prevalence of enterobiasis (Sung *et al*, 2001). In this respect, kindergarten and school-based mass control activities are likely to be more effective than individualized treatment.

Enterobiasis is a disease with usually mild symptoms, such as perianal itching and dermatitis; it is asymptomatic in most adult who have low worm burdens. In children, particularly those who have heavy worm burdens, neurological symptoms including nervousness, restlessness,

irritability, and distraction may occur, which may affect child development (Beaver *et al*, 1984; Cook, 1994; Song *et al*, 2003). Rarely, ectopic infections in the pelvic area or urinary tract of women can occur.

Egg positive rates in our study were rather low, which may result from using a single test. Goldsmith and Heyneman (1989) suggested that three tests will detect 90%, and five tests will detect 99%. Use of the cellophane tape method must be repeated to get the real prevalence in these communities.

Effective chemotherapeutic regimens have been developed and used for decades; however, the control of enterobiasis is difficult because of frequent reinfection and a short life cycle (Lee *et al*, 2001). Repeated health education concerning improved personal hygiene, regular inspections, and mass chemotherapy with appropriate anthelmintics are essentially required to control enterobiasis among children living in Phichit.

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