PARASITIC INFECTION AMONG PRIMARY SCHOOL STUDENTS IN MEUANG DISTRICT, PHITSANULOK PROVINCE, THAILAND

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Abstract. This study was to investigate the prevalence of parasitic infection among primary school students in Meuang District, Phitsanulok Province, Thailand. From February 2002 to December 2002, a total of 528 students was examined. The student age range was 6 to 10 years. Two hundred and sixty-six subjects were male and 262 were female (male to female ratio 1.02 : 1.00). A diagnosis of *Enterobius vermicularis* infection was made by using the Scotch cellulose tape technique and a diagnosis of parasitic infection was made by using the formalin-ether concentration technique. It was revealed that 1) thirty-one students (5.87%) were infected with *E. vermicularis* and *Trichuris trichiura*, 2) there was no significant difference in the incidence of infection with regard to student gender and age, 3) the family socio-economic backgrounds (education and income) had no relationship to the prevalence of the enterobiasis, 4) the prevalence of infection was significantly associated with the bathing behaviors of the subjects.

INTRODUCTION

Helminthic infections are a major health problem worldwide. The following estimates are based on those of the World Health Organization (WHO), between 1975-1986. Clonorchiasis and opisthorchiasis: 19 million infected; paragonimiasis: 3.2 million infected; fasciolopsiasis: 10 million infected; ascariasis: 1 billion infected; hookworm disease: 900 million infected; trichuriasis: 500-800 million infected; strongyloidiasis: 35 million infected. *Enterobius vermicularis* is particularly widespread among school-aged children. Several studies were carried out in urban slum areas in Bangkok, Thailand, which showed a rate of infection varying from 53% to around 65% (Vajarasthira and Harinasuta, 1960; Tepmongkol *et al*, 1980). Studies of pre-schoolaged children in Khon Kaen Province in the northeastern region of Thailand indicated a prevalence of 50.9% (Kaewkes *et al*, 1983). Research in Nakhon Pathom Province, an urban area adjacent to Bangkok, exhibited a prevalence rate of 38.2%. A cross-sectional survey of primary school students in Bang Phli District, Samut Prakan Province, Thailand, showed the prevalence of *Enterobius vermicularis* was 38.8% (Nithikathkul *et al*, 2001b) and 21.9% (Nithikathkul *et al*, 2001a).

Currently, the trend of scientific and technological development in Thailand has been impressive. Educational levels are rising throughout the country. Literacy rates are increasing rapidly and many more individuals are obtaining higher educations. Prevention and control programs dealing with parasitic diseases have been developed and implemented. Despite these advances, parasitic diseases remain a serious concern of the Thai public health system. Pinworm is primarily found in children. This is related to the fact that young children's hygiene practices may be inadequate, and children also exhibit behaviors that encourage infestation. This study, therefore, wanted to report the recent situation of parasitic infections among primary school students in Meuang District, Phitsanulok Province in the north of Thailand.

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MATERIALS AND METHODS

The population in the study covered students aged 6 to 10 years old. They were drawn from two schools in Meuang District, Phisanulok Province. Of these, 266 were male and 262 female. Diagnosis of *Enterobius vermicularis* infection was made by using the Scotch cellulose tape technique and diagnosis of other parasitic infections was made by using the formalin-ether concentration technique.

All stool specimens were fixed with formalin and carefully stored before being examined in laboratory of the Department of Microbiology and Parasitology, Faculty of Medical Science, Naresuan University. The formalin-ether concentration technique was used to

process all specimens. The presence of intestinal parasite eggs, larvae and protozoa was determined microscopically. Statistical data were then analyzed using the chi-square test.

RESULTS

The demographic data, genders, and ages of the sample are presented in Table 1. The prevalence rates of parasitic infections are also presented for two schools (Table 2). A total of 528 students was examined. Thirty-one (5.87%) were infected with *Enterobius vermicularis* and *Trichuris trichiura*; 28 (5.30%) were infected with *Enterobius vermicularis* by the scotch cellulose technique; 3 (0.57%) were infected with *Trichuris trichiura* by using the formalin-ether concentration technique. An analysis of the relationship between infection rates and age groups was conducted. There was no significant difference in the incidence of infection with regard to student gender and age. The rate for eight-year-olds was 6.0%, the highest. The family socio-economic background (education and income) had no relationship with the prevalence of enterobiasis. The prevalence of infection was marginally associated with hygiene practices, such as changing of underwear, and the bathing behaviors of the students ($p < 0.05$, χ^2 -test) (Table 3).

Table 1
Demographic information of respondents.

Characteristic	Examined cases	Total cases (%)
Gender	528	
Male	266	50.4
Female	262	49.6
Age (years)	507	
6-7	158	31.2
8	151	29.8
9-10	198	39.1

DISCUSSION

This study showed that the prevalence of *Enterobius vermicularis* was 5.30% and 0.57% were infected with *Trichuris trichiura.* 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. These concerns might be addressed by future research. It is hoped that the finding in this study will provide fundamental information concerning helminthiases in schoolchildren. These data can be subsequently utilized to develop programs to prevent and control helminth infections and thus decrease the prevalence of helminthiasis. It is of interest to compare our results with related prior studies.

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Table 2
Parasitic infection rate in two schools.

School	Male		Female		Total (%)
	No. examined	No. infected (%)	No. examined	No. infected (%)	
School 1	115	8 (7.0)	113	5 (4.4)	228
School 2	151	7 (4.6)	149	11 (7.4)	300

Table 3
Potential factors associated with infection.

Factors	No. of examined cases	Total infected cases (%)	p-value
Gender	528		0.443
male	266	12 (4.5)	
female	262	16 (6.1)	
Age (years)	507		0.557
6-7	158	7 (4.4)	
8	151	9 (6.0)	
9-10	198	7 (3.5)	
Family income (Baht) (1US$ ~40 Baht)	516		0.728
≤ 6,999	132	7 (5.3)	
7000-10,999	118	6 (5.1)	
≥11,000	266	10 (3.8)	
Parental education	521		0.956
Elementary	65	3 (4.6)	
Secondary-Diploma	191	9 (4.7)	
Bachelor degree and higher	265	11 (4.2)	
No. of children in family	513		0.273
2 - 3	128	9 (7.0)	
4	226	8 (3.5)	
5 - 10	159	6 (3.8)	
Underwear dressing	519		0.054
Every day	498	19 (3.8)	
2-3 days/week	21	3 (14.3)	
Bathing	520		0.060
Every day	498	19 (3.8)	
2-3 days/week	22	3 (13.6)	

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