อัตราความชุกของโรคพยาธิลำไส้ในประชากร ต.แม่ละมุ้ง อ.อุ้มผาง จ.ตาก

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นิพนธ์ต้นฉบับ

The prevalence rates of human intestinal parasites in Mae-la- moong, Umphang District, Tak Province, a rural area of Thailand

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Triteeraprapab S, Jongwutiwes S, Chanthachum N. The prevalence rates of human intestinal parasites in Mae-la-moong, Umphang District, Tak Province, a rural area of Thailand. Chula Med J 1997 Sep;41(9): 649-58

Background : *Intestinal parasites are still a major public health problem of Thailand. It is difficult for people in most remote areas to access health care facilities for stool examination.*

Objective : *To study the prevalence rates of intestinal parasites in people from a rural area of Thailand.*

Setting : *Mae-la-moong, Umphang District, Tak Province.*

Design : *Cross-sectional study.*

Subjects : *One hundred and twelve individuals with ages ranging from 3 months to 80 years old (mean ± SD = 23 ± 19; medine = 17) were recruited into the study. There were 62 males and 50 females. There were 48 individuals who were under 15 years old.*

Methods : *Examination of stool samples was performed by the formalin-ether concentration technique.*

Results : *Intestinal parasitic infections were present in 51 (46%) individuals. The most common parasites found were Ascaris lumbricoides (49%),*

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hookworm (33%) and Trichuris trichiura (22%). Other parasitic infections included Giardia lamblia (12%), Blastocystis hominis (10%), Opisthorchis viverrini (8%), Strongyloides stercoralis (4%) and Taenia (2%). Two non-pathogenic protozoa, Entamoeba coli and Endolimax nana, were found in 42% and 12% of the stool specimens, respectively. The majority of the infected individuals were under 15 years old.

Conclusion : *Parasitic infections were widely present in the population of a rural area in the northern part of Thailand.*

Key words : *Intestinal parasites, Stool examination, Prevalence rate, Rural area.*

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Received for publication. July 15, 1997.

สุรางค์ ไตรธีระประภาพ, สมชาย จงวุฒิเวศย์, ณัฐรส จันทชุม. อัตราความชุกของโรคพยาธิลำไส้ในประชากร ต. แม่ละมุ้ง อ. อุ้มผาง จ. ตาก. จุฬาลงกรณ์เวชสาร 2540 ก.ย;41(9): 649-58

ที่มาของปัญหา : *โรคติดเชื้อที่เกิดจากพยาธิลำไส้ยังคงเป็นปัญหาหลักทางสาธารณสุขของประเทศไทย ประชาชนที่อยู่ในพื้นที่ชนบทที่ห่างไกลมีความลำบากในการที่จะเข้าถึงสถานีอนามัย และโรงพยาบาลต่างๆ เพื่อตรวจอุจจาระ*

วัตถุประสงค์ : *เพื่อศึกษาอัตราความชุกของโรคพยาธิลำไส้ในประชากรที่อาศัยอยู่ในชนบทแห่งหนึ่งของประเทศไทย*

สถานที่ทำการศึกษา : *ต. แม่ละมุ้ง อ. อุ้มผาง จ. ตาก*

รูปแบบการวิจัย : *การศึกษาแบบ cross- sectional*

ผู้เข้าร่วมในการศึกษา : *ผู้ที่อาศัยใน ต. แม่ละมุ้ง อ. อุ้มผาง จ. ตาก จำนวน 112 ราย ที่มีอายุตั้งแต่ 3 เดือน ถึง 80 ปี เป็นชาย 62 ราย หญิง 50 ราย โดยผู้ที่มีอายุต่ำกว่า 15 ปี มีทั้งหมด 48 ราย*

วิธีการทำการศึกษา : *ตรวจอุจจาระด้วยวิธีเข้มข้นที่ใช้ formalin-ether*

ผลการศึกษา : *พยาธิลำไส้ถูกตรวจพบในผู้ป่วย 51 ราย (46%) พยาธิที่พบมากที่สุดคือ พยาธิไส้เดือนกลม (49%) พยาธิปากขอ (33%) พยาธิแส้ม้า (22%) ส่วนพยาธิอื่นที่ตรวจพบได้แก่ Giardia lamblia (12 %) Blastocystis hominis (10%) พยาธิใบไม้ตับ (8%) พยาธิเส้นด้าย (4%) และพยาธิตัวตืด (2%) นอกจากนี้โปรโตซัว ที่ไม่ก่อให้เกิดพยาธิสภาพ 2 ตัว คือ Entamoeba coli และ Endolimax nana ถูกตรวจพบ 42% และ 12% ตามลำดับผู้ป่วยส่วนมากอายุต่ำ กว่า 15 ปี*

สรุป : *โรคติดเชื้อทางปรสิตยังคงพบมากในประชากรชนบทแห่งหนึ่งที่อยู่ห่างไกลทางภาคเหนือของประเทศไทย*

Parasitic infections are still a major problem in many countries, including Thailand. A national epidemiological survey in 1996 showed that infections caused by parasitic helminths affected more than 35% of the Thai population.[1] Among the pathogenic parasitic infections, hookworm was found at the highest rate (22%) followed by liver fluke infections (12%).[1] Generally, the prevalence rates of intestinal parasitic infections vary from one area to others depending on the degree of personal and community hygiene, sanitation and climatic factors.[2] Consequentely, the ocurrence of parasitic infections are most commonly due to high-risk behaviors in uneducated individuals. The ability to examine and detect the intestinal parasites is limited in many regions of Thailand. Furthermore, people usually do not pay attention to self stool examination. The above mentioned factors, together with the lack of effective health education and an effective public health information system are the major obstacles to the control of parasitic infections in many countries, including Thailand. Using the formalin-ether concentration technique for stool examination, we report the prevalence of intestinal parasitic infections in a remote area of Thailand where people usually have limited access to health care facilities.

Materials and Methods

Study area and participants:

In concurrence with a survey of lymphatic filariasis, one hundred and twelve individuals of different ages and sex who lived in Mae-la-moong, Umphang District of Tak Province were included in the study. In cooperation with local health workers and health officers from the Ministry of Public Health, we dealt directly with the community leader who helped us authorize our activities with his section chiefs who then assisted us in maximizing community participation and compliance. The people in this area were willing to participate in the study. All participants received a physical examination during the visit. All individuals who had illnesses were referred to a hospital for appropriate treatment.

Stool examinations:

Stool specimens were obtained from all participants and examined for the presence of intestinal parasite eggs or larvae. Cartons were distributed to the residents the day before collection of samples. Specific instructions were given to the population about the handling of specimens to avoid contamination. All stool specimens were fixed with formalin and carefully stored before examination in the laboratory at the Department of Parasitology, Faculty of Medicine at Chulalongkorn University. The specimens were processed and examined by the formalin-ether concentration technique.

Results

Studied population

All individuals recruited in this study were residents of Umphang District in Tak Province. Cartons were provided to 145 individuals staying in the village at the time we visited. There were 112

(77%) individuals who returned their stool samples the next day. Out of the 112 individuals examined for intestinal parasites, 48 (43%) were children under 15 years old (30 boys and 18 girls) and 64 (57%) were adults (34 males and 30 females). The ages of the examined individuals ranged from 1 to 80 years old for females, with a mean of 23.5 ± 18.7 (median = 20). The male ages ranged from 3 months to 77 years with a mean of 22.6 ± 20.1 years (median = 15).

Intestinal organisms recovered

Of the 112 individuals examined, 51 (46%) were found to harbor intestinal parasites. The most common parasites were *Ascaris lumbricoides* (49%), hookworm (25%) and *Trichuris trichiura* (22%) (Figure 1). *Giardia lamblia, Blastocystis hominis, Strongyloides stercoralis* and *Taenia* were recovered in 12%, 10%, 4% and 2% of the examined stool samples respectively (Figure 1). Eight percent of people in the area carried *Opisthorchis viverrini.* Non-pathogenic organisms, Entamoeba coli and E. nana, were found with prevalences of 42% and 12%, respectively (data not shown).

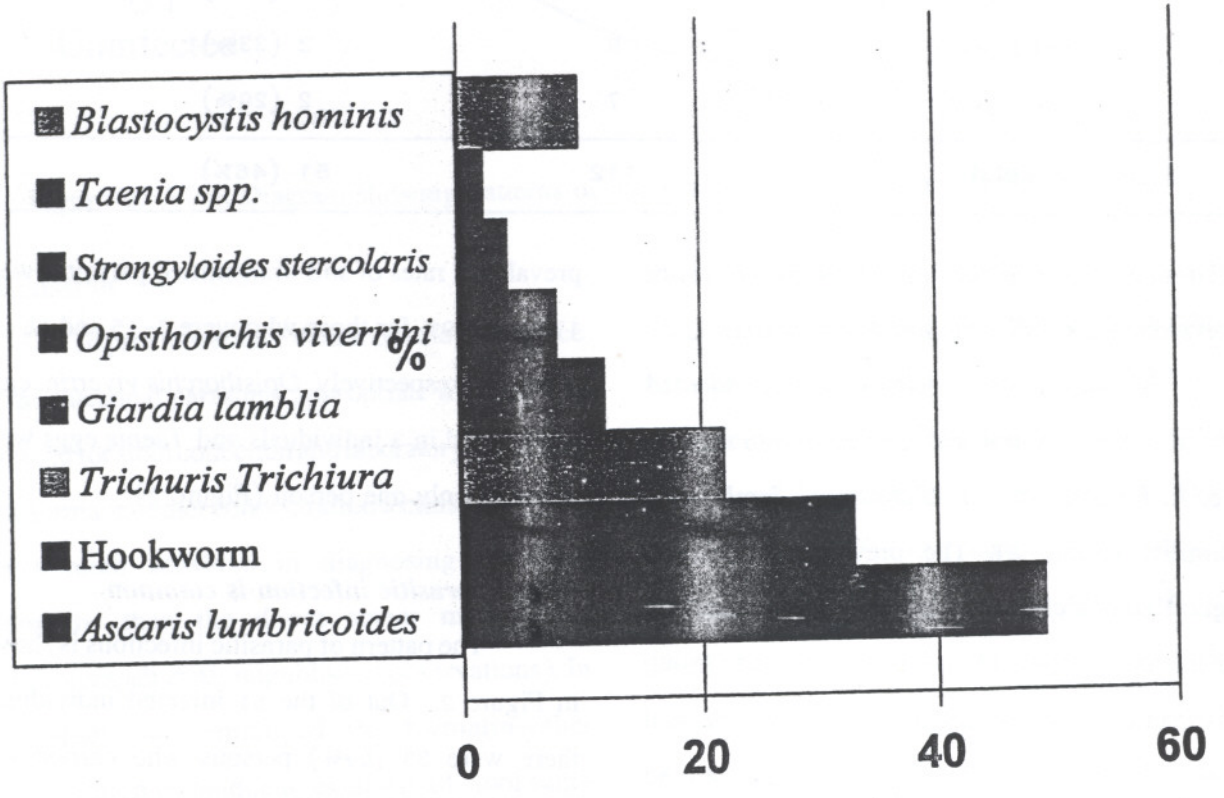

Figure 1. Proportion of intestinal parasites in infected cases.

Prevalence of parasitic infections in different age groups

The highest prevalence of parasitic infections detected by the formalin-ether concentration technique occurred in children aged 6 to 15 years (57%) (Table 1). A prevalence rate of 56% was found in those who were 31-45 years old. The infection rates were 39% and 41% among individuals of age groups less than 6 and 16-30 years old, respecitvely. Those who were 46-60 and more than 60 years old had infection rates of 33% and 29%, respectively.

Table 1. Prevalence of parasitic infections at various age groups.

Age group	Number examined	Number infected (%)
<6 years	23	9 (39%)
6-15 years	30	17 (57%)
16-30 years	27	11 (41%)
31-45 years	16	9 (56%)
45-60 years	9	3 (33%)
>60 years	7	2 (29%)
Total	112	51 (46%)

Feco-oral transmitted parasites were more prevalent than soil-transmitted parasites

The majority of people (43%) were infected with the parasites transmitted by feco-oral route (*i.e. A. lumbricoides, T. trichiura, G. lamblia, B. hominis*) (Table 2). The prevalence rate was highest among children aged under 15 years: 70% for the age group 6-15 and 48% for the age group less than 6 years. There were 22%, 31%, 33% and 29% of those in age groups 16-30, 31-45, 46-60 and more than 60 years old, respectively, who harbored intestinal parasites transmitted by feco-oral route. The soil-transmitted parasites (hook worm and *S. stercoralis*) had highest prevalence rates (50%) in the 31-45 years age group. The prevalence rates of soil-transmitted parasites were 17% and 19% for those who were 6-15 and 16-30 years old, respectively. *Opisthorchis viverrini* eggs were found in 3 individuals and *Taenia* eggs were found in only one person (Figure 2).

Mixed parasitic infection is common

The pattern of parasitic infections is shown in Figure 2. Out of the 51 infected individuals, there were 35 (69%) persons who carried one parasitic infection (Figure 2), while one-third harbored more than one parasite. There were 12 (24%) and 4 (8%) persons who had 2 and 3 parasitic infections, respectively (Figure 2).

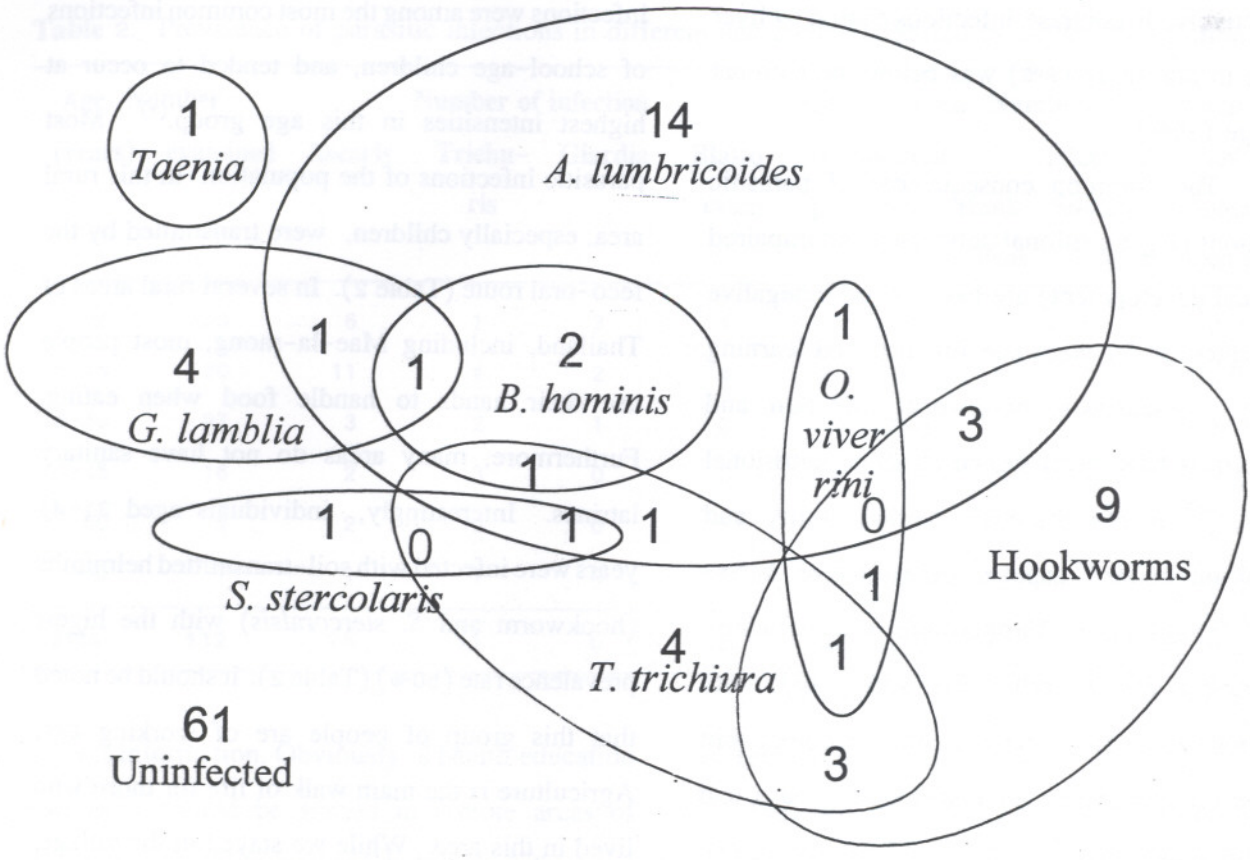

Figure 2. Venn Diagram showing patterns of parasite coinfection among infected individuals.

Discussion

To provide reliable data about the prevalence of the intestinal parasites, appropriate methods are required for stool collection and laboratory diagnosis. The formalin-ether concentration technique is three times more sensitive in diagnosing intestinal helminths than the direct smear method (2, Triteeraprapab *et al.*, unpublished observations). In this study, we employed the formalin-ether concentration technique to examine all stool samples in order to provide an accurate picture about the prevalence rates of intestinal parasites. In Thailand, a national survey in 1996 showed that the prevalence rates of intestinal helminths decreased from 41.7% in 1991 to 35% in 1996.[1] Such a high infection rate should be considered a public health problem. We found that over 46% of the people in Mae-la-moong, a remote area of Thailand, harbored at least one parasite. This number was more than the national average (35%) from the epidemiological survey in 1996.[1] Our data showed that the prevalence rates of parasitic helminths (*A. lumbricoides* (49%), hookworm (33%) and *T. trichiura* (22%) were highest among the studied population (Figure 1). The prevalence rates of these 3 common parasitic infections were higher than the prevalence rates from a national survey in 1991, which showed that Thais were infected most commonly with hookworm, *T. trichiura and A. lumbricoides* at rates of 27.7%, 4.3% and 1.48%

respectively. In contrast, infections caused by liver flukes in our study (8%) was below the national average (12%).

The common consequences of parasitic infections (*e.g.* nutritional deficiency and impaired physical development) are likely to have negative consequences for cognitive function and learning ability. Ascariasis, hookworm infection and trichuriasis have been shown to affect nutritional status,[3-5] mental function, verbal ability and inhibition-control aspects of cognitive behavior[6-8] in children. Furthermore, iron-deficiency anemia has a particularly strong link with impared functioning, and is a common component of the clinical picture of hookworm disease and intense trichuriasis.[7] It has also been shown that treatment with antihelmintic drugs improves cognitive performance[6] Most people infected with these parasites are the poor and malnourished. Parasitic infections and malnutrition will have effects on their mental and physical health. Though we did not measure the nutritional status of the studied population, the low socio-economic status together with the poor health condition (data not shown) implied the need for proper and adequate nutrition. Therefore, the treatment of parasitic infections and malnutrition should be performed simultaneously.

Our data showed that most individuals infected with parasites were under 15 years old. The highest rate (57%) was among the age group of 6-15 years (Table 1). This data agreed with several studies which showed that intestinal helminth infections were among the most common infections of school-age children, and tended to occur at highest intensities in this age group.[7] Most parasitic infections of the population in this rural area, especially children, were transmitted by the feco-oral route (Table 2). In several rural areas of Thailand, including Mae-la-mong, most people use their hands to handle food when eating. Furthermore, many areas do not have sanitary latrines. Interestingly, individuals aged 31-45 years were infected with soil-transmitted helminths (hookworm and *S. stercoralsis*) with the higest prevalence rate (50%) (Table 2). It should be noted that this group of people are of working age. Agriculture is the main walk of life for those who lived in this area. While we stayed in the village, we also found that most individuals who worked outdoors did not wear appropriate shoes (data not shown).

The high infection rates of helminth parasites in our studied population emphasizes the urgent need for effective measures and treatments to control the parasitic infections, especially in the area where health care is difficult to obtain. Basic health education and sanitation (*e.g.* washing hands before meals, wearing shoes) should be initiated and emphasized, not only to children but also adults, so that all individuals will understand the basic methods to prevent these preventable parasitic infections. Furthermore, since residents in rural areas usually respect local health personnel and health workers, these health teams should be the key persons to provide the health education and

Table 2. Prevalence of parasitic infections in different age groups stratified by routes of infection.

Age (years)	Number examined	Number of infection				Total Fecooral transmitted parasites	Number of infection		Total Soil-transmitted sparasited
		Ascaris	Trichuris	Giardia	Blastocystis		Hookworms	Storngyloide	
<6	23	6	1	3	1	11 (48%)	0	0	0 (0%)
6-15	30	11	4	2	4	21 (70%)	4	1	5 (17%)
16-30	27	3	2	1	0	6 (22%)	5	0	5 (19%)
31-45	16	2	3	0	0	5 (31%)	7	1	8 (50%)
46-60	9	2	0	0	1	3 (33%)	0	0	0 (0%)
>60	7	1	1	0	0	2 (29%)	1	0	1 (14%)
Total	**112**	**25**	**11**	**6**	**6**	**48 (43%)**	**17**	**2**	**19 (19%)**

correct information. Obviously, a health education campaign should be started in remote areas of Thialand. Soil-transmitted helminth infections, both hookworm infection and strongyloidiasis, were common in adults. Therefore, the habit of wearing shoes should be recommended. Furthermore, a program for building economical and sanitary latrines is critical.

Acknowledgements

We gratefully acknowledge the financial support of the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR). We are thankful to the assistance of Umphang Hospital, the local health workers, the health officers from the Ministry of Public Health and all the staff at the Department of Parasitology, Faculty of Medicine, Chulalongkorn University. We thank Dr. Issarang Nuchprayoon and Ms. Songpun Sangprakarn for data analysis.

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