Helminthiasis in Remote Area under Pha Daeng Project in Northern Thailand

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Abstract

Background : Helminthiasis, predominantly opisthorchiasis and hookworms, continue to be significant public health problems in Thailand. Ministry of Public Health has established a national plan to promote and coordinate interaction and intervention among provincial public health sectors. The purpose of the study were to investigate the prevalence and associated factors with helminthiasis.

Methods : The surveys study were conducted and reliable information was collected regarding the nature and prevalence of helminthiasis in remote area [17.693388, 98.240757 (Lat 17 41'36.20 Long 98 14'26.73)], under Pha Daeng project, Om Koi, Chiang Mai province, Thailand. This study investigated the children and their parent stool examination by formalin ether concentration techniques. A total of 117 stool samples were examined for helminthiasis.

Results : The results showed the majority of stool sample was 63.2 % from children' age below 15 year old. The overall prevalence of helminthiasis among the Thai hill tribe people was 15.4%. The helminthiasis prevalence of *Ascaris lumbricoides*, *Taenia* spp. and hookworm were 11.10%, 2.60% and 1.70 % respectively.

Conclusion : The study showed that the prevalence of helminthiasis is still high and require the health educational program in the remote area. The investigators would propose the health promotions and behavioral investigations can help to solve the problems based on learning ability for developmental and self-consciousness on the individual level *and* community for the prevention and control of parasitic worms infection.

Keywords: Helminthiasis, Remote area, *Ascaris lumbricoides*

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Introduction

Soil transmitted helminths, (STH) including *Ascaris lunbricoides*, *Trichuris trichiura* and hookworm, are estimated to infect more than 2 billion humans and is a major health problem worldwide. The following estimates are based on those of the World Health Organization (WHO) between 1975-1986. Ascariasis: 1 billion infected Hookworm: 900 million infected Trichuriasis: 500-800 million infected Strongyoidiasis: 35 million infected [1-2]. STH still main cause of mobility has been associated with anemia, induce malabsorption of nutrients, stunt growth and produce low IQ's (The main causes of mobility are associated with anemia which is due to malabsorption of nutrients, stunt growth and low IQ's). Effect on childhood growth have been attributed to changes in appetite and iron loss [3-4]. In the Year 2009, The national cross-sectional surveys define the overall prevalence of helminthaisis in northeastern, north, southern and total of Thailand were 26.0%, 17.7%, 19.8% and 18.1% respectively [6].

No researcher has evaluated the epidemiology of helminthes infections in the Pha Daeng Karen hill tribe that live in Chiang Mai province (Statistical data collection for the evaluation of helminthes infections in the Pha Daeng Karen hill tribe that live in Chiang Mai province has not been conducted yet). Aside from this epidemiologic data, information about the correlation of demographics/ behaviors and helminthes infection may help target screening and treatment of helminth infections in this population. Follow up analysis of this population could help track the effectiveness of education by the health department on prevention of helminthes infections. The health department has identified several ways to reduce helminthes infections. These efforts emphasize education about personal hygiene such as washing hands, cleaning clothes and proper sanitation of human waste. Other measures include roper dietary habits like cooking food and boiling water and wearing footwear. The present study is the first report to determine the prevalence of helminthiasis in remote area under Pha Daeng Project in northern, Thailand.

Materials and Methods

The Study was carried out in Pha Daeng recommended project village in Chiang Mai province, a northern province 787 km from Bangkok, the capital of Thailand. The socioeconomic situation in villages is very poor i.e. houses are made of wood and bamboo. The main occupations of villagers are farmer. In the villages helminthiasis was screened. The total estimated population in village was 516 people. The children and their parents enrolled in this study were between one and over sixty years of age, and were drawn from village in the Sob Khong sub-district, Om Koi district of Chiang Mai province, Thailand. The study population was sampled from all children in those

villages. A total of 117 stool samples were examined for helminthiasis.

Helminthaisis Diagnostic Methods

The investigator interviewed the children and parents for information concerning personal data of the children and the family's socioeconomic status, i.e. parents' occupations and children in family. They were collected from the children as they entered the testing site. The total male and female population was 55 and 62, respectively. All subjects were interviewed, and stool specimens were collected. Stool specimens were fixed with formalin and carefully stored before examination in a laboratory at the Parasitology Research Unit, Faculty of Science, and Chiang Mai University. The formalin-ether concentration technique was used to process all specimens. The presence of intestinal parasite eggs, larva and protozoa was determined microscopically.

Statistical data were analyzed using the software EPI-INFO (Version 2, Centers for Disease Control and Prevention, Atlanta, USA). Descriptive statistics were used to describe the distribution of the demographic and socio-economic characteristics of the subjects. The chi-square test was used to compare differences in the distribution of categorical variables, or the chi-square test for trend when appropriate. A statistically significant difference was determined when p-value was less than 0.05.

Results

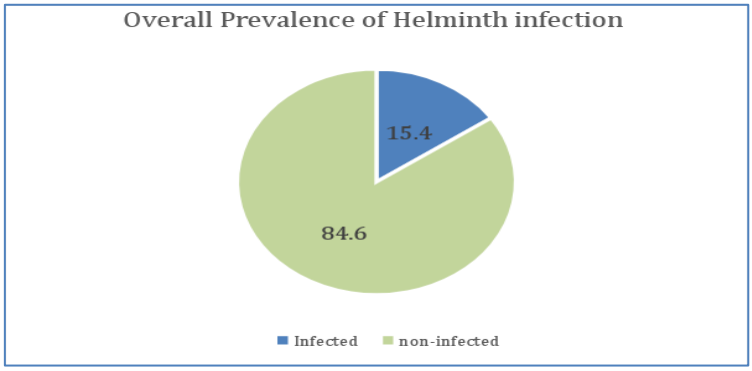


Figure 1 The overall helminthiasis prevalence in remote area under Pha Daeng project

Figure 1., demonstrated the prevalence of *A. lumbricoides*, Hookworm and *Taenia spp*. Infection in the remote area under Pha Daeng Project

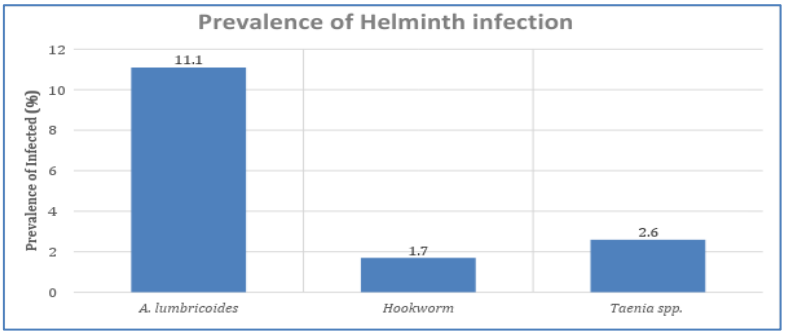


Figure 2 The prevalence of helminthaisis (Ascariasis, Hook worm infection and Taeniasis)

The majority of STH infection in the study showed *A. lumbricoides* infection was 11.1 %.

Table 1 Demographic information associated with helminthiasis

Factor	Infected (%)		Chi-square	p-value
	Negative	Positive		
Age [Years]			8.235*	0.152
<15	61(82.4)	13(17.6)		
15-20	6(75.0)	2(25.0)		
21-30	18(100.0)	0		
31-40	6(100.0)	0		
41-50	5(71.4)	2(28.6)		
51-60	2(66.7)	1(33.3)		
➢ 60	1(100.0)	0		
Sex				
Male	43(78.2)	12(21.8)	3.30	0.078
Female	56(90.3)	6(9.7)		
Education level				
Illiterate	16(84.2)	3(15.8)	2.286*	0.339
Primary School	82(85.4)	14(50.0)		
Secondary School	1(50.0)	1(50.0)		
Occupation				
Agriculture	35(37.2)	9(20.5)	1.442*	0.466
Employee	5(100.0)	0		
Students/unemployed	59(86.8)	9(13.2)		
Income per month				
No-income	2(66.7)	1(33.3)	0.762*	0.097
<2500	97(85.1)	17(14.9)		
Number of member in family				
0-2	1(100.0)	0	6.558*	0.218
3-4	24(88.9)	3(11.1)		
5	57(86.4)	9(13.6)		
6	1(50.0)	1(50.0)		
7	7(63.6)	4(36.4)		
8-10	9(90.0)	1(10.0)		

Overall population 516 and 117 subjects were recruited including all age-groups from 1 years of age to more than 60 years. Of these, 55 were males and 62 were females (male to female ratio 1:1.13). Microscopy revealed parasites in 18 stool samples (15.38 percent). The highest prevalence (33.3 percent) was found in villagers aged 51-60 years. Most detected parasites (13 cases, 11.1 percent) was *Ascaris lumbricoides.* Other intestinal parasites included Hook worm, and *Taenia* egg as it is shown in figure 2. An analysis of the relationship between infection rates among different age groups, sex, educational level, occupations, income and density in family of the villagers 21.8%. (Table 2).

Table 2. Factor associated with helminthaisis

Factor	Infected (%)		Chi-square	p-value
	negative	positive		
Water resource			0.009*	<0.05
Mountain	76(84.4)	14(15.6)		
Villages	23(85.2)	4(14.8)		
Drinking water resource			0.009*	<0.05
Mountain	76(84.4)	14(15.6)		
Villages	23(85.2)	4(14.8)		
Helminthiasis knowledge			0.222*	<0.05
Very good	3(100.0)	0		
good	19(86.4)	3(13.6)		
fair	77(83.7)	15(16.3		
Helminthiasis prevention behaviors			0.219*	<0.05
Very good	9(90.0)	1(10.0)		
good	65(83.3)	13(16.7)		
fair	25(86.2)	4(13.8)		

* P<0.05

The test on the rate of infection among different water resources status (water resource and drinking water resources) knowledge and prevention behavior indicated that the highest infection rate was found among the villagers (P<0.05, χ^2 - test) (Table 2)

DISCUSSION

The phenomenal in the present study reveals a parasitic infection rate of 15.4% among hill tribe villager living in remote areas of Om koi district, Chiang Mai Province, Thailand. This is the first report of helminthaisis in the remote area under Pha Deang Project. The previous study revealed a parasitic infection rate of 11.0% among long neck hill tribes [7]. The study indicated that water resources, drinking water resources showed a statistically significant difference. However, sex of villagers give rise to no statistically significant difference in the incidence of infection among the villagers. In further studies, we can investigate the relationship between the level of infection and clinical signs. Factors not evaluated in the study include a detailed analysis of the village' physical environment, population density in comparison to residential areas, behavior 'and the extent of the public health services and hygiene relating to parasite infestation and transmission. The previous reported clearly demonstrate that high and low land surface temperature and extreme arid environments limit transmission of STH species, and suggest differing transmission dynamics in rural and urban environments [5].

Possible explanations for these results could rest in the fact that environmental water resources have high impact for helminthiasis in remote area. Improved health services and sanitation may improve both the environment and available health care services for quality of life care. Factors influencing the infection rate may include personal hygiene, levels of public health care services, social interactions in the community, and attention to hygiene, for example by cooked food habits, foods and hand washing and regular bathing. Further studies will evaluate the correlation of these risk factors and clinical symptoms with helminthes infection. Follow up evaluations could measure the effectiveness of education by the health department on prevention of helminthes infections

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