Survey of the Fluke Infection Rate in Ban Khok Yai Village, Khon Kaen, Thailand

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Abstract

The prevalence of fluke infection was studied in Ban Khok Yai Village, Khon Kaen Province, northeastern Thailand. A total of 395 stool specimens was obtained from the villagers. Formalin-ether centrifugation technique was applied to the fecal specimens after collection. Of 395 subjects, 113 (28.6%) were positive for parasites by stool examination. The fluke infections were *Opisthorchis viverrini* (11.1%), *Echinostoma* spp (2.3%), minute intestinal flukes (1.8%) and *Fasciola* spp (0.2%). Other intestinal parasites were *Strongyloides stercoralis* (2.0%), hookworms (1.8%), *Sarcosystis* spp (5.3%), *Entamoeba coli* (2.0%), *Ascaris lumbricoides* (0.2%), *Taenia* spp (0.2%), *Giardia lamblia* (1.0%), *E. histolytica* (0.2%) and *Endolimax nana* (0.2%). Fluke infection, particularly *O. viverrini* infection, was the most common in the old age group (51 years and up). The percentage of raw freshwater fish consumption (koi pla, pla som and pla ra) among the villagers was found to be 92.6%, while defecation on the ground during the villagers'working hours in the rice fields was 75.9%.

Keywords: fluke infection, prevalence

Flukes (liver and intestinal flukes) are still endemic in northeastern Thailand. Khon Kaen is one of the northeastern provinces that previously reported a prevalence of fluke infections, such as *Opisthorchis viverrini*, *Echinostoma* sp and minute intestinal flukes. Research in Ban Non Moung Village (1983) found *O. viverrini* (21.3%), *Echinostoma* sp (1.2%) and minute intestinal flukes (10.5%) [1]. Studies done in Ban Donboom Village, Mueang District (1988) found *O. viverrini* (8.6%), *E. malayanum* (1.1%) and minute intestinal flukes (0.5%) [2]. The overall prevalence of fluke infection in Khon Kaen Province has continuously declined. This result may be due to Ministry of Public Health concern about the control program of liver fluke infection. Ban Khok Yai Village was selected as the focus of our study because raw fish and snail consumption which can potentially cause fluke infection, has been generally found among the villagers.

From a total of 1,020 villagers, 395 stool specimens were obtained (sample size (n) was calculated as follows; $n = [N Z^2\alpha_{/2} \pi (1-\pi)] / [e^2(N-1) + Z^2\alpha_{/2}\pi(1-\pi)]$, $N = 1,020$, $Z\alpha_{/2} = 1.96$, $\pi = 26.98$ (π = the prevalence of fluke infection in a previous study) [3], $e = 0.05$). The result of the calculation showed that the sample size (n) should be 234. Therefore, at least 234 stool specimens should be collected for stool examination in this study. The collected samples were subjected to a formalin-ether sedimentation technique [4]. The habits of raw fish consumption and defecation on the ground were also investigated.

Of 395 subjects (ages ranging from 4-87 years), 113 subjects (28.6%) were positive for parasites by stool examination.

The fluke infections were *O. viverrini* (11.1%), *Echinostoma* spp. (2.3%), minute intestinal flukes (1.8%) and *Fasciola* spp.(0.2%).

Other intestinal parasites were *Strongyloides stercoralis* (2.0%), hookworms (1.8%), *Sarcosystis* spp (5.3%), *Entamoeba coli* (2.0%), *Ascaris lumbricoides* (0.2%), *Taenia* spp (0.2%), *Giardia lamblia* (1.0%), *E. histolytica* (0.2%) and *Endolimax nana* (0.2%). Distribution of fluke infection by age group is shown in Table 1.

Table 1 shows that pre-school and school age groups were negative for flukes by stool examination. The prevalence of *O. viverrini* and total fluke infections were rather low in the teen-age, young adult, adult and middle age groups but then increased rapidly in the old age group (aged 51 years and up).

Of 405 subjects, 375 (92.6%) reported raw freshwater fish consumption (koi pla, pla som and pla ra). Of 395 subjects, 300 (75.9%) reported defecation on the ground during their working hours in the rice fields.

The present study reveals fluke infection rates of *O. viverrini* (11.4%), *Echinostoma* spp (2.3%) and minute intestinal flukes (1.8%), which were slightly higher than those found in previous studies done in Ban Donboom Village [2], but lower than those found in Ban Non Moung Village [1].

In Ban Khok Yai Village, most of the villagers persist in the habit of consuming raw fish. However, the prevalence of fluke infection is rather low. This may be due to anthelminthic drugs or the light intensity of metacercariae in uncooked fish (koi pla, pla som and pla ra) and snails (koi hoi). The metacercariae of liver fluke in fermented fish were unable to survive during the period of fermentation of more than 3 days in pla som [5] and more than 3 weeks in pla ra [6]. Therefore, the villagers who consumed pla som and pla ra after the periods mentioned were not infected.

Most of the villagers use their latrines when they are at home; however, defecating on the ground in the bush during their working hours in the rice fields is a common practice. In the rainy season, there is the possibility of pollution of the ponds near the village by matter containing *Opisthorchis* eggs, echinostome eggs, minute intestinal eggs and other parasite eggs. Therefore, the life cycle of the flukes can be completed in this area with the presence of the intermediate hosts (snails and freshwater fish), thus perpetuating the reservoir of fluke infection.

In the previous studies, the prevalence of *O. viverrini* was very low in pre-school aged children (0-6 years), then increasing rapidly in the school aged children (7-12 years), and the highest prevalence was in adults (21-40 years)

Table 1 Distribution of fluke infection by age group.

Status	Age group	No. of stool examined	No. positive (%)				
			Ov	Echi	Mif	Fas	Total no. of fluke infections
Pre-school	0-6	8	0	0	0	0	0
School age	7-12	36	0	0	0	0	0
Teen-age	13-20	25	2 (8.0%)	1 (4.0%)	0	0	3 (12.0%)
Young adult	21-30	36	4 (11.1%)	0	1 (2.8%)	0	5 (13.9%)
Adult	31-40	73	7 (9.6%)	2 (2.7%)	2 (2.7%)	0	11 (15.1%)
Middle age	41-50	94	8 (8.5%)	2 (2.1%)	1 (1.1%)	0	11 (11.7%)
Old age	51+	123	23 (18.7%)	4 (3.2%)	3 (2.4%)	1 (0.8%)	31 (25.2%)

Ov (*Opisthorchis viverrini*), Echi (*Echinostoma* sp), Mif (minute intestinal fluke), Fas (*Fasciola* sp)

[2,7]. However, in this study, the highest prevalence of *O. viverrini* is found in the old age group (aged 51 years and up). The pattern of infection is due to the habit of consuming risk foods and lack of anthelminthic treatment.

From this study, it is suggested that the liver fluke control program should include health education to promote and encourage the villagers to consume cooked fish and defecate properly during their working hours in the rice fields, stool examination and treatment of positive cases with praziquantel.

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