

人類生態班

Prevalence of eggs of liver fluke (*Opisthorchis viverrini*) and other helminth in Lahanam,
Savannakhet, Lao P.D.R

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SUMMARY

This study was conducted in Lahanam zone of Songkhone district of Savannakhet province, Lao P.D.R. There are six villages in Lahanam zone, and there are five primary schools in the area. Stool examination and treatment were performed for all school children (total number = 670 children) from grade 1 to grade 5, registered at Lahanam in September 2004. Liver fluke, *Opisthorchis viverrini* (*Ov*) was the most common intestinal parasite with prevalence of 49 % , followed by hookworm with 32 % . *Ov* egg-positives were treated by praziquantel at schools (selective mass-chemotherapy) and all the children were treated for hookworm by albendazol (mass-chemotherapy).

In September 2005, after one year of treatment, stool examination was repeated for the same children in schools. Due to the move to the new academic year, school children of the previous grade 5 had already graduated and we did not include them. Prevalence of *Ov* and hookworm after one year of treatment were 29% and 12% , respectively.

Children attending Bengkhamlay primary school located about 5 km from Banghiang River had lower prevalence for *Ov*. And higher prevalence of hookworm than other schools located within 2 km from the river ($p < 0.001$).

In December 2005, community stool examination was carried out in Bengkhamlay. The subjects were all the villagers in Bengkhamlay age 5 years old and over. The prevalence of *Ov* in those over 15 years old (284 people) was 66.2% and the age group showing the highest prevalence (77.5%) was 30-39 years old. Prevalence of hookworm was 31.3 % in those over 15 years old. Intensity of *Ov* infection was low to moderate with increasing tendency by age up to middle age, and become low after 60 years old.

INTRODUCTION

Lowland area of southern Laos P.R.D., including western part of Savannakhet province has long been known as an area where the liver fluke, *Opisthorchis viverrini* (*Ov*), is endemic, due to the habit of eating raw river fish. Some kinds of fish are infected with metacercaria of *Ov* in this area. Thus, eating raw river fish is a risk of *Ov* infection.

There are five primary schools in the six villages of Lahanam zone: Bengkhamlay (grade 1-5), Lahanam thong (grades 1-3), Lahanam tha (grades 1-5), Dongbang (grades 1-5) and Kokphock (grades 1 and 2). Bengkhamlay primary school is located about 5 km from Xe Banghiang River, a tributary of the Mekong River, while the other four primary schools are within about 2 km of the river.

Stool examination was performed every three months beginning in September 2004. This paper presents an

outline of the results of these examinations.

METHODS

The Kato-Katz stool examination was performed for all school children in Lahanam (670 children) in September 2004. As prevalence of infection with intestinal parasites was expected to be high, the antiparasitic agent Albendazol (250 mg) was administered to all subjects after the first stool examination. Children egg-positive for *Ov* were treated with praziquantel (40 mg/kg body weight). Stool examinations were conducted every three months *i.e.*, in December 2004, and in March, June, and September 2005. After the stool examination in September 2005, positive cases were treated with Albendazol and praziquantel.

Villagers over 5 years old in Bengkhamlay underwent stool examination and received treatment in December 2005.

The Kato-Katz thick smear technique followed by the WHO standard was used. The intensity of infection means the number of parasites in the body; the parasites live mainly in the liver and bile duct. The lifespan of *Ov* in humans is thought to be over 25 years. A worm does not die easily once one enters inside the body. When the number of parasites increases, the number of eggs excreted increases. The intensity of infection in eggs per milligram of faeces (eggs/mg) is classified as follows: mild, 1-999 eggs/mg; moderate, 1,000-9,999 eggs/mg; severe, $\geq 10,000$ eggs/mg.

SUBJECTS and DATA USED

A total of 730 (female= 397) subjects were enrolled from all primary schools in Lahanam in September 2004. The stool examination was performed for 670 children. They all submitted faeces for analysis. The subjects' age ranged between 4 and 16 years old.

In September 2005, we did stool examination in the same schools. Subjects consisted of the previous grade 1 to grade 4 and new grade 1 students (68 children). We used data for children who were in the previous grades 1 to 4 in September 2005.

2. In Bengkhamlay village, stool samples from a total of 485 subjects over 5 years old (female=258) were examined in December 2005. School children in Bengkhamlay village were treated in September 2004. Therefore, to show the *Ov* prevalence before treatment, we combined the data of school children in September and December 2005. If a child is egg-positive either in 2004 or 2005, we judged one is positive.

RESULTS AND DISCUSSION

1. School children

The prevalence of parasite infections is shown in Table 1. In September 2004, 48.2 % of the students examined were infected with *Ov* and 32.2% were infected with hookworm. In contrast, the prevalence rates of *Ascaris* and *Trichuris trichiura* infection were less than 3%. The prevalence was higher in older children.

For *Ov*, prevalence reduced from 48.2 % to 20.4 % after selective mass-chemotherapy, maintained low

Table 1. Prevalence rates of parasites in primary school children, Lahanam

	Sep. 2004	Dec. 2004	Mar. 2005	Jun. 2005	Sep. 2005
N	670	682	658	521	611
Hookworm	32.2	12.5	16.9	18.8	12.4
<i>Ascaris</i>	0.1	0	0.2	0	0
<i>Trichuris</i>	2.5	1	0.9	1.2	0.5
<i>O. viverrini</i>	48.2	20.4	19.8	37.7	29.1

prevalence after six months of treatment (19.8 % in March 2005), then increased to 37.7 % in June 2005. Prevalence in June 2005 was higher than that in September 2005. The reasons for this may be a change in laboratory technicians and small number of children participated in the stool examination due to the school holidays.

Ninety-nine children (16.2 %) had been re-infected with *Ov* and 39 (6 %) had been re-infected with hookworm.

Table 2 shows the prevalence of *Ov* and hookworm among children by region. Geographically, of the schools in Lahanam area, Lahanam thong, Lahanam tha, Dongbang and Kokphock are located close to the Banghiang River, while Bengkhamlay primary school is located 3-5 km away from Banghiang River. While children in Bengkhamlay showed high prevalence of hookworm, children from Lahanam area showed the high prevalence of *Ov*. This tendency was seen both before and one year after the treatment (all, $p < 0.001$). These results suggest the variation in parasite infections even within this region.

Table 2. Differences in prevalence between two areas in Lahanam

		Sep. 2004		Sep.2005	
		N		n	
Hookworm	Bengkhamlay	87	53.7%	33	22.1%
	Lahanam area	129	25.4%	43	9.3%
<i>O. viverrini</i>	Bengkhamlay	47	29.0%	18	12.1%
	Lahanam area	276	54.3%	160	34.6%

2. Bengkhamlay village

The prevalence of parasite infections of villagers aged 15 years old and over in Bengkhamlay village is shown in Table 3. We used only the data from subjects over 15 years old, as egg-positives among the school children aged between 5 and 14 years old were treated by praziquantel in September 2004, and all the school children took albendazole. Of these subjects of 15 years old and over, 66.2% were infected with *Ov* and 31.3% were infected with hookworm. Prevalence of *Ascaris* and *Trichuris trichiura* infection was less than 3% .

Table 3. Prevalence rates of parasites in Bengkhamlay village (over 15 years old)

	n		n		N		n				
Hookworm	89	31.3%	<i>Ascaris</i>	0	0.0%	<i>Trichuris</i>	6	2.1%	<i>O. viverrini</i>	188	66.2%

Fig. 1 shows the prevalence of *Ov* by sex and age group. For the prevalence of age group 5 to 9 and 10 to 14 years old we combined the results of September 2004 and December 2005. Yet, prevalence of these groups were much lower than that of adults. The highest prevalence was observed in the age group 30 to 39. In the age group over 15 years old. Prevalence among men are higher than women.

Fig. 2 shows the classification of infection by age group. Most cases are mild infection. Cases of moderate infection increase with age, and mark the highest in 50s. The proportion of moderate infection is low in 60s. Severe infection was observed in age group 15 and 19 years old.

CONCLUSIONS

The results of this study indicated that Lahanam is an endemic area of *Ov*. More than half of the primary school children and nearly 80 % of adults were positive for *Ov* infection. This is because their residences are near the river and they have a custom of eating raw fish, although not all fish are a risk of *Ov* infection. Prevention requires regular stool examination and treatment, and health education to teach the villagers which fish should not be eaten raw. In addition to the examinations described above, stool examination for *Ov* was

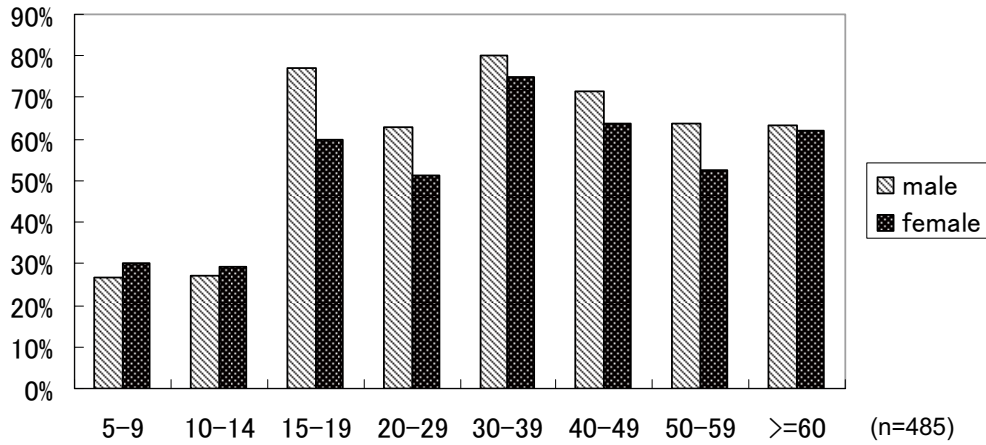


Fig. 1 Prevalence of *Opisthorchis viverrini* in Bengkhamlay village (Over 5 years old)—students Sep. 2004 or Dec. 2005 and adults Dec. 2005.

	n	5-9	10-14	15-19	20-29	30-39	40-49	50-59	>=60
male	227	23 (44.2%)	24 (54.5%)	10 (76.9%)	17 (63%)	32 (80%)	15 (71.4%)	7 (63.6%)	12 (63.2%)
female	258	26 (49.1%)	31 (60.8%)	10 (66.7%)	19 (51.4%)	30 (75%)	14 (63.6%)	10 (52.6%)	13 (61.9%)

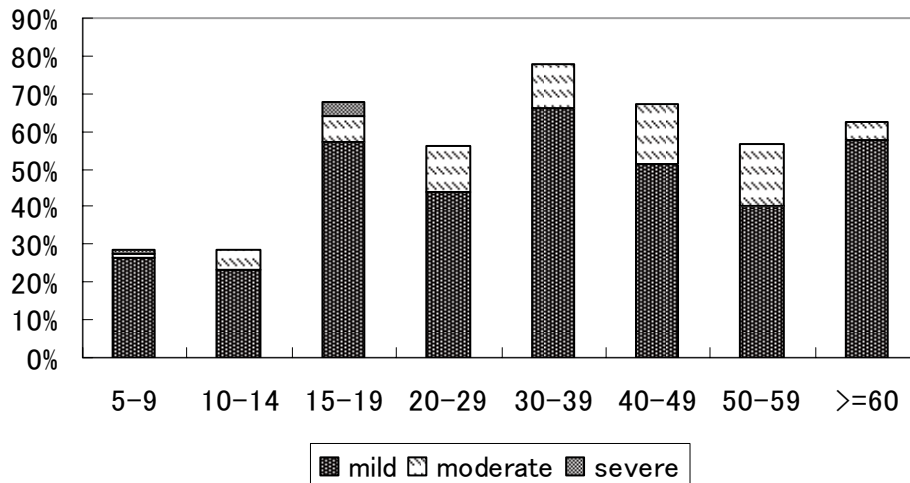


Fig. 2 Intensity of *Opisthorchis viverrini* infection in Bengkhamlay village School children of 5-14 years old: positive cases of Sep. 2004 or Dec. 2005 (The higher intensity was counted.) Adults 15 years old and over: Dec. 2005.

performed using the formalin-ether method at Savannakhet Hospital in December 2004. Stool examination was performed by the Kato-Katz method for six days continuously in ten school children in December 2004 and for ten days continuously in adults in Bengkhamlay village in December 2005. These results are currently being processed and will be reported in the near future.

Stool examination in both parents and children will be useful for the development of health education programs toward the prevention of infection.

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APPENDIX

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Effect of *Opisthorchis viverrini* infection on growth of schoolchildren in a community of Central Lao P.D.R.

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[ABSTRACT]

Kato-Katz stool examination for eggs of the liver fluke *Opisthorchis viverrini* (*Ov*), hookworms, and other helminths was conducted in 670 school children in the Lahanam Demographic Surveillance Site, Savannakhet Province, central Lao P.D.R., in September 2004. The childrens' height and weight were measured simultaneously. The prevalence of *Ov* was 48%. The highest prevalence of 62% was observed in children in grade 5, while the lowest prevalence of 37% was observed in those in grade 1. All the *Ov*-positive cases were treated with praziquantel, and mass albendazole treatment was conducted for all participants for hookworm and other helminths. Another stool examination in these school children was conducted one week after treatment, and 41% were shown to be *Ov*-positive. Thirty-five percent of the children who were negative on the first examination were positive on the second examination (113 of 322). They were not treated for one year. School stool examination was repeated in December 2004, March 2005 and September 2005. Anthropometry was repeated in September 2005. Three hundred and three children (134 boys and 169 girls) completed the study and their data were used for the present analysis. The mean age of the subjects was 9.0 years old. The prevalence of *Ov* decreased from 39% at the first stool examination and 42% at the second examination in September 2004 to 18% in December 2005 and to 17% in March 2005, then increased to 22% in September 2005. The height and weight increased from 121.6 to 126.9 cm and from 22.9 to 25.6 kg, respectively. The study population included 117 children who were positive and received treatment, 63 first-negative and second-positive children who received no treatment, and 123 who were both negative and untreated. There were no significant differences in weight or height gain among the groups. Although the prevalence of *Ov* among school children was high, the intensity of infection was not high. Thus, this study did not demonstrate a clear positive effect of deworming. Further studies are necessary to determine the morbidity caused by *Ov* infection.