

A small-scale survey of intestinal helminthic infections among the residents near Pakse, Laos

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Abstract: A small-scale epidemiological survey was undertaken on the residents along the Mekong River near Pakse, Laos, to know the status of helminthic infections. A total of 137 fecal samples were collected from the staffs of the provincial government, their family, and primary schoolchildren in Pakse City, Champassak Province, and examined by Kato-Katz smear technique. The overall helminth positive rate was 75.9%, and the helminths detected were *Opisthorchis viverrini* (43.8%), *Ascaris lumbricoides* (26.3%), *Trichuris trichiura* (19.0%), hookworms (19.0%), *Strongyloides stercoralis* (2.2%), *Taenia* sp. (0.7%), and *Schistosoma mekongi* (1.5%). To obtain the adult worm of the liver fluke, three infected persons were treated with praziquantel and purged with magnesium sulfate. Five, 10, and 395 adult flukes, respectively, were collected from their diarrheic stools, all of which were morphologically identified as *O. viverrini*. The results represent that the liver fluke and soil-transmitted helminths are highly prevalent, and the life cycle of *S. mekongi* is likely to be maintained in this area.

Key words: *Opisthorchis viverrini*, *Ascaris lumbricoides*, *Trichuris trichiura*, hookworms, *Strongyloides stercoralis*, *Taenia* sp., *Schistosoma mekongi*, fecal examination, epidemiological survey, Laos

INTRODUCTION

Lao People's Democratic Republic (Lao PDR) is located in the middle of South Asia, and the Mekong River runs from the northwest to the south and southeast direction. Pakse, capital of Champassak Province, is a riverside city, facing the northeastern border of Thailand, and not far from the southern border between

Laos and Cambodia. Previous studies from Laos have shown that *Opisthorchis viverrini* and soil-transmitted helminth infections are prevalent around Vientiane Municipality (Sornmani *et al.*, 1974; Pholsena *et al.*, 1991) as well as in Khammouane Province (Kobayashi *et al.*, 1996), about 500 km and 200 km north to Pakse, respectively. It is also known that schistosomiasis *mekongi* is prevalent in Khong island, about 120 km south to Pakse (Sornmani, 1976). However, little information is available on the status around Pakse area. The present study was performed to know the status of helminthic infections among the residents in Pakse area.

A total of 137 fecal samples were collected from the residents residing near Pakse City,

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Champassak Province (Fig. 1), during September-October, 1995. The subjected people included 90 provincial government staffs and their family, and 47 primary schoolchildren. The samples were examined by Kato-Katz thick smear technique, and when needed, such as for confirmation of *Strongy-*

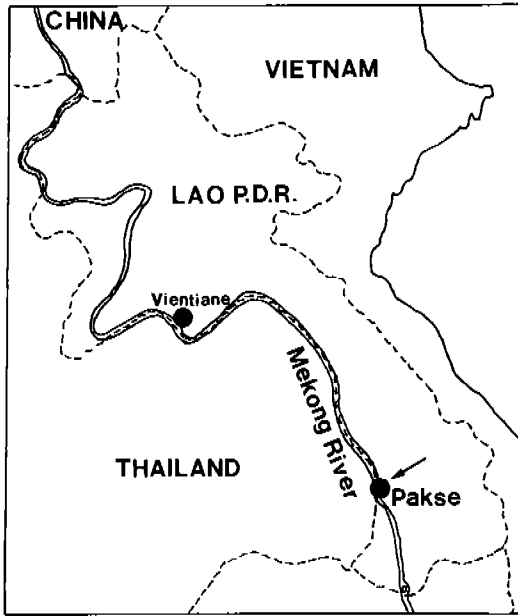


Fig. 1. Map showing the surveyed area (arrow: Pakse, Laos).

loides stercoralis larvae and *Schistosoma mekongi* eggs, direct smear technique was also applied.

For recovery of adult flukes, three *O. viverrini* egg positive persons were treated with 10 mg/kg single dose of praziquantel and purged with 30 g magnesium sulfate, and 2-3 hrs later their diarrheic stools were thoroughly collected. The adult flukes were searched under stereomicroscopy, and if present, isolated into a petri dish, washed several times in tap water, and fixed with 10% formalin. They were dehydrated, stained with acetocarmine, and mounted in balsam for morphological observation.

Seven helminth species were detected among the residents examined (Table 1). The overall helminth positive rate was 75.9%; the rate being higher in provincial staffs and family who were adults (82.2%), than in schoolchildren (63.8%). The most common helminth was *O. viverrini* (43.8%) followed by *Ascaris lumbricoides* (26.3%), *Trichuris trichiura* (19.0%), hookworms (19.0%), *S. stercoralis* (2.2%), *Taenia* sp. (0.7%), and *S. mekongi* (1.5%). It was notifiable that the prevalence of *O. viverrini* was much higher in adults (provincial staffs and family; 54.4%) than in children age group (23.4%). The prevalence of *A. lumbricoides* was a little higher in children (29.8%) than in adults (24.4%), and that of hookworms was reversed

Table 1. Results of fecal examination of the provincial staffs, their family, and schoolchildren near Pakse City, Laos

Helminth	No. eggs or larvae positive rate (%)		
	Provincial staffs/family	Schoolchildren	Total
No. examined	90 ^{a)}	47 ^{b)}	137 ^{c)}
No. helminth positive	74 (82.2)	30 (63.8)	104 (75.9)
<i>Ascaris lumbricoides</i>	22 (24.4)	14 (29.8)	36 (26.3)
Hookworms	20 (22.2)	6 (12.8)	26 (19.0)
<i>Trichuris trichiura</i>	17 (18.9)	9 (19.1)	26 (19.0)
<i>Opisthorchtis viverrini</i>	49 (54.4)	11 (23.4)	60 (43.8)
<i>Strongyloides stercoralis</i>	3 (3.3)	0	3 (2.2)
<i>Taenia</i> sp.	1 (1.1)	0	1 (0.7)
<i>Schistosoma mekongi</i>	1 (1.1)	1 (2.1)	2 (1.5)

^{a)}Provincial staffs and family: 45 males, 40 females, and 5 unknown (mean age: 35.1, age range 15-70)

^{b)}Schoolchildren: 26 males, 21 females (mean age: 9.9, age range 5-13)

^{c)}Total: 71 males, 61 females, 5 unknown

(adults 22.2% vs children 12.8%). No significant difference in the egg positive rate was observed between sex of the examined people. *S. mekongi* eggs were detected from a 35-year old male and a 13-year old male student.

From the diarrheic stools of the three volunteers (38-year old female, 25-year male, 28-year male), who were positive for *O. viverrini* eggs, and treated with praziquantel and purged with magnesium sulfate, 5, 10, and 395 adult flukes, respectively, were collected. All of the flukes collected were morphologically identified as *O. viverrini*.

In the present study it has been shown that intestinal helminth infections are highly prevalent among residents near Pakse area. The overall prevalence of helminths was higher in adults than in children, and it was greatly attributed to the higher prevalence of *O. viverrini* in adults (54.4%) than in children (23.4%). A similar age-prevalence of *O. viverrini* infection was reported among the people in Vientiane, Laos, where the average egg positive rate was 46.5% (Sornmani *et al.*, 1974). Over 95% egg positive rate of *O. viverrini* was reported among the people (over 15 years of age) in Ban Nanin, a village near the Nam Ngum dam, Vientiane Province (Pholsena *et al.*, 1991). It is also of interest that, according to a recent report from Khammouane Province (Kobayashi *et al.*, 1996), the prevalence of *O. viverrini* among children under 15 years of age was 38.6% in Nathandong village and 36.2% in Nathantong village, considerably higher than in this survey. These data indicate that opisthorchiasis *viverrini* continues to be a health problem not only in adults but also in children residing along the Mekong River.

The main source of infection with *O. viverrini* in Laos as well as northeast Thailand is known to be a traditional fish food called "Koi-pla", which contains raw fish flesh chopped with garlic, lemon juice, fish sauce, chilli, roasted ground rice, and raw vegetables, or other similar foods such as "Pla-la", "Som-fak" and "Pla-som" (Rim, 1982). In Pakse area, such food was easily seen sold at the market during this survey period. Preventive measures, health education and mass chemotherapeutic trials for opisthorchiasis should be urgently operated in Pakse area.

The reason for harvesting adult flukes of *O. viverrini* in this study was to confirm whether the egg positive cases were in fact infected with *O. viverrini* alone or mixed-infected with other kinds of flukes such as heterophyids, since the eggs of the former and the latter much resembled one another. According to the results, the three persons examined were all infected only with *O. viverrini*. However, heterophyid infections such as *Haplorchis* sp. should be investigated further in this area.

Soil-transmitted helminths such as *A. lumbricoides*, *T. trichiura*, hookworms, and *S. stercoralis* were also prevalent in Pakse area. But the prevalence was quite lower than those reported recently from two rural villages of Khammouane Province (Kobayashi *et al.*, 1996). The lower prevalence in Pakse area is presumed to be due to its semi-urban environment compared with the rural environment of Khammouane Province. In Vientiane, capital of Laos, 49.3% of *A. lumbricoides*, 49.9% of *T. trichiura*, 30.6% of hookworms, and 13.7% of *S. stercoralis* were reported some twenty years ago (Sornmani *et al.*, 1974). Recently, however, the rates are presumed to have been much lowered in Vientiane, although little data are available.

Two egg positive cases of *S. mekongi* were detected in this study, although clinical features of these cases were not pursued. It is not a new finding that *S. mekongi* is distributed near Pakse area, because Gilliard in Paris detected a case of schistosomiasis from a Laotian student who came from an island near Pakse (Sornmani, 1976). However, detection of eggs during an epidemiological survey in Pakse appears to be new so far as the literature are concerned. The most prevalent area of *S. mekongi* infection in Laos is Khong Island, 120 km south to Pakse, where 14.4% of 209 residents examined were positive for eggs (Sornmani, 1976). Considering the results of the present study and the three cases detected from northern Laos who swam in the Mekong River near the cities of Vientiane and Luang Prabang (Wittes *et al.*, 1984), *S. mekongi* seems to be distributed more widely than previously considered.

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=초록=

라오스 메콩강 유역 Pakse 지역 주민의 장내 윤충류 감염률 조사

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라오스 남부의 메콩강 유역에 위치한 Pakse 지역 주민의 장내 윤충류 감염 상황을 조사하였다. 대상 인원은 현지 보건소 직원 및 가족 등 성인 90명과 초등학교 학생 47명으로 모두 137명이었다. 검사방법으로는 Kato-Katz 셀로판후층도말법을 이용하였고, 1인당 1회 검사하였다. 검사 결과, 총 충란 양성률은 75.9%로 매우 높았고, 검출된 윤충은 *Opisthorchis viverrini* (평균 양성률 43.8%), 회충 (26.3%), 편충 (19.0%), 구충 (19.0%), 분선충 (2.2%), 유.무구조충 (0.7%) 및 메콩주혈흡충 (*Schistosoma mekongi*) (1.5%)이었다. *O. viverrini* 충란 양성자 3인으로부터 충체를 회수하고자 프라지관텔로 치료하고 하제를 투여한 바 설사변에서 *O. viverrini* 성충 5, 10 및 395마리를 각각 회수할 수 있었다. 이상의 결과로 라오스의 Pakse 지역은 *O. viverrini* 및 토양매개성 윤충 감염이 농후하며, 메콩주혈흡충의 생활사가 이루어지고 있을 것으로 추측되었다.

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