

SOCIAL AND BEHAVIORAL FACTORS ASSOCIATED WITH *CLONORCHIS* INFECTION IN ONE COMMUNE LOCATED IN THE RED RIVER DELTA OF VIETNAM

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Abstract. Social behavioral factors associated with *Clonorchis* infection are needed for control measures. The population in Nga Tan commune were randomly sampled and questioned to determine knowledge, perception, and health behavioral factors associated with *Clonorchis* infection among heads of households. The cellophane thick smear method was applied to examine their stool samples. Seven hundred and seventy-one cases were examined, the positive rates were 17.2 %, 66.9 %, 78.7 %, 15.9%, and 0.14% for *Clonorchis sinensis*, *Ascaris lumbricoides*, *Trichuris trichiura*, hookworm, and *Dicrocoelium dendriticum* respectively. There was no significant difference between the infection rate of clonorchiasis, education level, and family income groups ($p > 0.05$). But there was significance difference between the infection rate of clonorchiasis and people living in different family sizes ($p < 0.01$). Thirty-four clonorchiasis patients treated with praziquantel 25 mg/kg/day for three days showed a cure rate in 30 days of 97.1%.

INTRODUCTION

Clonorchis sinensis is an important human parasite and is commonly found in South Korea, China, Taiwan, Japan, and Vietnam. The habit of eating raw fish caused disease endemic in large area of several countries. The morbidity and mortality caused by the infection are important public health problems in endemic areas. Clonorchiasis is a common liver infection in northern of the Red River Delta of Vietnam. The National Institute of Malariology, Parasitology and Entomology of Vietnam reported infection rates of clonorchiasis in 11 provinces, namely Nam Dinh (3-35%), Ninh Binh (20-30%), Ha Nam (3%), Hai Phong (13.1%), Bac Giang (16.3%), Ha Tay (16%), Thanh Hoa (2.5%), Thai Binh (0.2%), Hoa Binh (0.3-5.1%), Phu Yen (36.9%), and Dak Lak (2.7-12.5%). Kieu *et al* (1986) carried out a survey in Nga Tan commune, Nga Son district, Thanh

Hoa Province, where the infection rate of *Clonorchis sinensis* was 2.5% by direct smear method. The study was conducted in Nga Tan commune, Nga Son district, Thanh Hoa Province of Northern Vietnam. The present study aims to clarify the parasite status of the residents by Kato thick smear method, social and behavioral factors associated with *Clonorchis* infection and effectiveness of treatment with praziquantel (25 mg/kg/day for 3 days).

MATERIALS AND METHODS

Study site

The study site was an endemic area at Nga Son district, Thanh Hoa Province of Northern Vietnam; this commune is located in the Red River Delta, about 150 km south of Hanoi. The population totalled 2,300 and most of the residents farmers. A total of 721 villagers, 15-60 years old, were studied. Two hundred and six heads of households or spouses were interviewed about knowledge, perception, and experience regarding *Clonorchis* infection, using a structured questionnaire.

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Stool examination and patients treatment

Stools were collected from 721 villagers and examined with Kato thick smear and formalin detergent technique. The positive *Clonorchis* patients were treated with praziquantel at a dose of 25 mg/kg/day for three days.

Data analysis

Chi-square test was used to test the hypotheses and to determine the association of social and behavioral factors with infection rates of *Clonorchis*, ie age, gender, eating raw fish, etc.

RESULTS

It was found that a high percentage of vil-

lagers had knowledge of the disease (93.7%) and the cause of disease (91.7%), where as 15.5% did not realize signs and symptoms of clonorchiasis. The majority of the villagers did not know about the problem of reinfection (85.0%). It also found that 87.4% of the villagers did not know the drug for treatment. Some of them thought that it was available at any drug store and could be used for any helminthic disease (Table 1). About 85% of them perceived that clonorchiasis was dangerous, 83% believed that the disease was able to cause death, only 10.7% knew that it would be cured if they stop eating raw fish. The villagers in Nga Tan who had experience of eating raw fish dish (*goi ca*) were 88.8%. Their reasons were its delicacy (85%), community eating environment

Table 1
Knowledge of clonorchiasis among 206 heads of households or spouses.

Knowledge items	Number (%) of respondents	
	Yes	No
1. Knowledge of the disease	193 (93.7)	13 (6.3)
2. Knowledge of cause disease	189 (91.7)	17 (8.3)
3. Knowledge of symptom	174 (84.5)	32 (15.5)
4. Knowledge of prevention	134 (65.0)	72 (35.0)
5. Knowledge of reinfection	31 (15.0)	175 (85.0)
6. Knowledge of treatment	26 (12.6)	180 (87.4)

Table 2
Habits of eating raw fish *goi ca* of 206 household, residents in Nga Tan commune.

Characteristic	Number of respondents	
	N= 206	%
Never eat <i>goi ca</i>	23	11.2
Eat <i>goi ca</i>	183	88.8
Eat in the field	89	43.2
Eat in building house	73	35.5
Home daily	170	82.5
Entertaining friends	23	11.2
Frequency of eating <i>goi ca</i> in past two months		
One to two times	150	72.8
More than two times	33	16.0
Where did you get the fish?		
Fishing from the pond	182	88.3
Buying from market	24	11

(64.1%), it would make them healthy (21.8%). The majority of fish (88.3%) was obtained by fishing in ponds near the house and 11.7% of fish were bought from the market (Table 2). The males had eaten *goi ca* (95.9%) while females had eaten it (23.9%) (Table 3). The ages of eating *goi ca*

were significantly different between age groups 40 to 49 years and *Clonorchis* infection was more prevalent in males than females ($p < 0.01$) (Tables 4, 5). Almost all houses (99.5%) in Nga Tan commune had latrines and 9.2% said they defecated in the field. There were 68% of houses using night

Table 3
Gender of 721 resident in Nga Tan commune, related eating *goi ca*.

Gender	Number (%)		
	Eat	Never eat	Total
Male	378 (95.5)	16 (4.1)	394
Female	78 (23.9)	249 (76.1)	327
Total	456	265	721

Chi-square $p < 0.01$

Table 4
Age groups of 721 residents in Nga Tan commune eating raw fish (*goi ca*).

Age groups (years)	Number of respondents	Eating <i>goi ca</i>	
		Number	%
15-19	78	24	30.8
20-29	153	82	53.6
30-39	222	148	66.7
40-49	159	120	75.5
50-59	77	51	66.2
≥ 60	32	21	65.6
Total	721	456	63.2

Table 5
Infection rates of clonorchiasis by age groups and gender of 721 residents.

Age groups (years)	Male		Female		Total	
	Number	%	Number	%	Number	%
15-19	37	0	41	0	78	0
20-29	69	17.4	84	3.6	153	9.8
30-39	124	32.3	98	9.2	222	22.1
40-49	104	40.4	55	3.6	159	27.7
50-59	40	25	37	0	77	13.0
≥ 60	20	30.0	12	0	32	18.8
Total	394	27.9	327	4.3	721	17.2

Table 6
Helminthic infections in 721 villagers of Nga Tan commune examined by Kato thick smear method.

Helminthes	Infected villagers	
	Number	%
<i>Clonorchis sinensis</i>	124	17.2
<i>Dicrocoelium dendriticum</i>	1	0.14
<i>Ascaris lumbricoides</i>	483	66.9
<i>Trichuris trichiura</i>	568	78.7
Hookworm	115	15.9
Total examined	721	-

soil as fertilizer in growing vegetable crops.

The stool examination results of 721 cases by Kato technique were *Clonorchis sinensis* 17.2%, *Dicrocoelium dendriticum* 0.14%, *Ascaris lumbricoides* 66.9%, *Trichuris trichiura* 78.7%, hookworm 15.9% (Table 6). The intensity of *C. sinensis* eggs were recorded as low (94.9%), moderate (4.3%), and high (0.8%). Thirty-four cases with different intensities of clonorchiasis were treated with praziquantel (25 mg/kg/day) for three days; the cure rate was 97.1% (Table 8). Stools were collected from seven patients; adult worms of *Clonorchis sinensis* were found and one adult *Dicrocoelium dendriticum* was found in feces of one patient. The side effects were headache (4%), dizziness (4.8%), and weakness (3.2%).

Table 7
Social factors associated with clonorchiasis infection of 206 household respondents in Nga Tan commune.

Characteristics	Number examined	Number of infected cases	Percent	(N= 206)
Family income (Million Dong = MD)				
Low(<1.5 MD/year)	11	3	27.3	Fisher's exact
Middle(1.5-3MD/y)	186	31	16.7	= 1.45
High(≥ 3.1 MD/y)	9	3	33.3	p>0.05
Education level				
Primary school	100	16	16.0	Fisher's exact
Secondary school	99	20	20.2	= 0.46
Illiteracy	7	1	14.3	p>0.05
Family size				
≤ 6 members	183	27	14.8	Chi-square
> 6 members	23	10	43.5	= 11.39, p<0.01

Table 8
Efficacy of praziquantel (25 mg/kg/day for 3 days) in 34 patients of clonorchiasis in Nga Tan commune.

Intensity of infection	Number of cases treated	After 30 days number of cases cured (%)	After 30 days number of cases not cured (%)
Light (1-999 EPG)	32	32 (100)	0
Moderate (1,000-9,999 EPG)	1	1 (100)	0
Heavy (10,000-29,999 EPG)	1	0	1 (0)
Total	34	33 (97.1)	1 (2.9)

DISCUSSION

The infection rate of *Clonorchis sinensis* in villagers in Nga Tan commune was 17.2%. It was higher than that found in the survey conducted by Kieu *et al* (1992), which was 2.5% in the same village by direct smear method. The highest infection rate was 27.7% in the age group 40-49 years and the lowest (0%) was in the age group 15-19 years. This may be due to the longer exposure of the older group in eating raw fish. The older villagers were difficult to persuade to change eating habits (Kino *et al*, 1998). In this study, the male infection rate was 27.9% and female infection rate was 4.3% in (Table 5). In Kim Son district, Ninh Binh Province, the infection rate in males was 37.2% and in females was 15.3% (Kieu *et al*, 1992). In Baise district, Guangxi Province, China the infection rate in males was 60.4%, in females was 15.9% (Chen *et al*, 1994). The high infection rate in males related to habit of eating raw fish while working together in the fields or during the meeting. Since females infrequently participate in such gatherings, they have less exposure to the infection. In Thailand, male infection rate with *Opisthorchis viverrini* was higher (33.6%) than females (28.4%), who often eat raw fish with alcoholic drinks (Sornmani *et al*, 1973). The prevalence of clonorchiasis, as well as intensity of human infection, was related to the culture of eating raw fish. *Clonorchiasis* was mainly observed among the people living in southern and northeastern parts of China where the traditional habit of eating raw fish exist (Fang, 1994). Praziquantel 25 mg/kg/day for 3 days in 34 patients with *Clonorchis* infection in the Nga Tan commune gave a cure rate of 97.1% at one month after initiation treatment. Other reports of treatment in Vietnam were 94.7% by Kino *et al* (1998), and 91.3% by De *et al* (1998). To control *Clonorchis sinensis* in Vietnam, there is a need to promote health educa-

tion focused on changing the habit of eating raw fish, and not using stools as fertilizer or defecating in the pond, plus giving praziquantel for treatment at low cost to the people. There was no significant difference between infection rate of *Clonorchis*, education level, and family income groups ($p>0.05$). But there was a significant relation between infection rate of *Clonorchis*, eating raw fish (*goi ca*), and family size ($p>0.01$) (Table 7). This study reported that the large number of people who consumed raw fish (*goi ca*) can get high infection rate in that community.

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