

Epidemiology & Health Bulletin

- 65 Survey of *Schistosoma japonicum* and Intestinal Parasites in Retired Servicemen and Foreign Laborers
71 Cases of Notifiable and Reportable Diseases, Taiwan-Fukien Area
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Survey of *Schistosoma japonicum* and Intestinal Parasites in Retired Servicemen and Foreign Laborers

1. Introduction

Schistosoma japonicum is a parasite most prevalent in China and many south-eastern Asian countries. Taiwan is fortunately not infected. Till now, no evidence indicates that there have been indigenous cases of human infection in Taiwan. The indigenous *Oncomelania hupensis formosana*, a snail, has been proved capable of being infected by the China strain⁽¹⁾ and the Philippine strain⁽²⁾ of human *Schistosoma japonicum*. The snail is found in small quantity in Yuanshan Township of Ilan County, Peitou and Puyen townships of Changhua County, and the Laonung River of Kaohsiung County. Between 1965 and 1976, the snail was found in six more counties, Nantou, Chiayi, Taitung, Hualien, Tainan and Yunlin. Including the three counties, the snail can be found in nine counties in Taiwan Province⁽²⁾. Another indigenous snail, *Oncomelania hupensis chiui* is found in Shihmen and Pali townships of Taipei County. This small snail is the only known host most susceptible to all strains of *Schistosoma japonicum*⁽²⁾. Therefore, Taiwan can potentially be an epidemic area of *Schistosoma japonicum*. Visit to mainland China has been opened for visiting relatives and tourism. Each year, around one million people visit mainland China. Since October 1979, some ten thousands of workers from the Philippines, Thailand, Malaysia and Indonesia have been brought in. These countries (except Malaysia) have been infected by *Schistosoma japonicum*. A survey in this respect is, therefore, most important.

2. Materials and Methods

Subjects studied in the survey are retired servicemen residing collectively in the Houses of Retired Servicemen who had visited relatives on mainland China between 1991 and 1992, and foreign laborers brought in from south-east Asia in March and April 1993. Retired servicemen in seven Houses of Retired Servicemen in the northern, central, southern and eastern parts of Taiwan who had visited relatives in this period, with the assistance of the health rooms of these houses, were randomly selected for blood collection. Sera were centrifugalized on the spot and stored in low temperature

for transporting back to the laboratory. They were tested for their antibody titers by the indirect hemagglutination method. Feces were also collected at the same time for the testings of intestinal parasites. Specimens were collected from some 2,000 men. Two more fecal specimens were collected from the serologically positive ones for the miracidium hatching test. For foreign laborers, 14 hospitals designated for the physical examination of foreign laborers were requested to cold-store serum specimens of foreign laborers who had been physically examined during the period. Specimens of some 1,500 foreign laborers were collected in May 1993 for testing their antibody titers with the indirect hemagglutination method in the laboratory. In addition, the Neihu General Hospital was asked in April 1993 to conduct fecal examination for parasites for 300 foreign laborers. The laboratory methods are summarized as follows:

Testing for serum antibody titers for *Schistosoma japonicum*:

Cellognost set of Behring, Germany, for the Indirect Hemagglutination of Schistosomiasis was used as the reagent. The titer higher than 1:64 was identified as positive. In each testing, control testings for both positive and negative were conducted at the same time for comparison.

Miracidium hatching test for *Schistosoma japonicum*:

Feces of serologically positive ones only were collected for this testing for the demonstration of ova. Around 10 gm of fresh feces was mixed with 500 cc water and filtered. After 20 minutes of sedimentation, the upper suspension was discarded. The sediment was mixed with water again and illuminated under light for one hour to identify miracidium. For the retired servicemen, two fecal specimens were collected from each; only one for the foreign laborers.

Fecal examination for parasites:

Formalin-ether method was used for parasite examination. For each specimens, sediments on glass slides stained with iodine were examined twice.

3. Findings

Of the 1,842 retired servicemen (Table 1) tested for *Schistosoma japonicum* with the indirect hemagglutination method, 22 (1.2%) were found positive (titers at 1:64 and above). They were twice examined with the miracidium hatching test though no miracidium was identified. 1,497 fecal specimens were examined with the MGL method, of them, four (0.27%) were found to be infected with *Ascaris*, hookworm, whipworm or Chinese liver fluke. Ova of roundworm were found in one person. Protozoa of *Entamoeba histolytica* were identified in 4 persons (0.27%), two of the trophozoite and the other two, the cyst; *E. coli* identified in two persons (0.13%); *E. nana* in 3 persons (0.20%); *G. lamblia* in 3 persons (0.20%). All were of single infection. 29 were positive for intestinal parasites, giving a positive rate of 1.94%.

Sera from 1,529 foreign laborers (1,423 from Thailand, 90 from Malaysia, 10 from Indonesia and 6 from the Philippines) were collected from 14 hospitals. After testing by IHA for *Schistosoma japonicum*, 194 of them (12.69%) were shown positive. Miracidium hatching test of fecal specimens of 38 of them (all from Thailand) showing negative. 232 fecal specimens (all from Thailand) were collected from the Neihu General Hospital for parasite examination. Both parasite ova and protozoa were demonstrated in 30 of them, giving a high infection rate of 17.24%. The infection was: 6 with hookworm (2.59%), 2 with whipworm (0.86%), 21 with *Opisthorchis viverrini* (9.05%), 6 with *Echinostoma* sp. (2.59%), 2 with *Taenia* sp. (0.86%), and 1 with *Trichostrongylus orientalis* (0.43%). Only 3 were infected with *Giardia lamblia* (1.29%). One person was infected at the same time with *Echinostoma* sp. *Opisthorchis viverrini* and *G. lamblia*. The rest were all single infection.

4. Discussion

In the present survey, 1,842 single retired servicemen who had visited mainland China and 1,529 foreign laborers from south-east Asia had been tested serologically by IHA method for *Schistosoma japonicum*. 22 of the former (1.20%) and 194 of the latter (12.69%) were found positive. Fresh fecal specimens were collected from the 22 retired servicemen and 38 of the 194 foreign laborers for miracidium hatching test and also test for parasite ova, though none was found positive of either. *Schistosoma japonicum* is prevalent in the Philippines, Thailand and Indonesia. Though none of the few Thai laborers examined was found positive in the present survey, the physical examinations of the ever-increasing foreign laborers should still be strictly executed. Examination for intestinal parasites in foreign laborers has received attention in the last two years. Chao et al.⁽³⁾ examined 433 Thai laborers for intestinal parasites in 1992. Of them, 100 were found to be infected with intestinal parasites, giving a positive rate of 18.5%. The 8.31% infection rate of *Opisthorchis viverrini* was the highest which was close to the finding of the present survey. Speculations were that either the examination or treatment of the laborers before departure was inadequate. Lo et al.⁽⁴⁾ had similar findings in their study of 1993. The helminth infection of laborers from Thailand, the Philippines, Malaysia and Indonesia, particularly infections of roundworm, hookworm and whipworm, was found to be common, Indonesians with an infection rate of 23.9% were the highest to be followed by 13.7% of the Filipinos, 11.4% of the Thais and 5.7% of the Malaysians. By parasites, more whipworms were found in Indonesians (13%) and the Filipinos (6.7%); more *Opisthorchis viverrini* in the Thais (5.5%); and more roundworm (1.9%), whipworms (1.9%) and hookworms (1.3%) in the Malaysians. Lee⁽⁵⁾ studies 589 foreign laborers in the central part of Taiwan to find a parasite infection rate of 20.88%; a 12.73% of *Opisthorchis viverrini* infection rate among the Thais; and similar infection rates for other parasites. Yen⁽⁶⁾ studied 283 foreign laborers of the same four nationalities in the southern part of Taiwan to find a parasite infection rate of 10.6%; the Thais were the highest with an infection rate of 21.9%; the Indonesians with an infection rate of 17.0%; the Filipinos with a rate of 9.2%; and the Malaysians with the lowest rate of 1.9%. From these studies, one can conclude that the infection of intestinal parasites in foreign laborers is common, and that the physical examination before departure is inadequate. Labor-exporting countries should be requested to

improve the pre-departure physical examinations to prevent the spread of diseases in Taiwan.

Lo⁽⁴⁾ in 1990 studied 200 retired servicemen who had been to mainland China for intestinal parasites to find all negative. The study did not find ova of *Schistosoma*; the parasite infection rate was at the low range of 1.94%. The findings indicate that the retired servicemen were generally in good personal hygiene.

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Table 2. Serological Tests for *Schistosoma japonicum* in Foreign Laborers with IHA Method

Area	Hospital	No. Examined	No. Positive	% Positive	Remarks
Neihu, Taipei C.	Neihu General Hospital	232	44	18.97	Thais
Taipei C.	NTUH	21	1	47.6	Thais
Hsinlien	Tien's Hospital	17	0	0	Indonesian (10), Malaysian (7)
Linkou	Chang Gung Memorial	111	9	8.11	Thais
Taoyuan	Provincial Taoyuan Hospital	337	54	16.02	Thai (305), Malaysian (32)
Taoyuan	Army 804 Hospital	264	25	9.47	Thais
Taoyuan	Mingsheng Hospital	132	8	6.06	Thais
Taoyuan	St. Paul's Hospital	217	47	21.66	Thai (200), Malaysian (17)
Taichung	China Medical College Hospital	14	0	0	Malaysian
Taichung	Jen-Ai Hospital	57	2	3.51	Thai (51), Malaysian (6)
Taichung	Shun-Tien Hospital	4	1	25.00	Thais
Shalu	Shalu General Hospital	5	0	0	Malaysians
Changhua	Hsiu-Chuan Hospital	15	0	0	Malaysian (9), Philippine (6)
Tainan	Fengchia Hospital	103	3	2.91	Thais
Total	14 Hospital	1,529	194	12.69	Thai (1423), Malaysian (90), Indonesian (10), Philippine (6)