Encouraging self-reliance in the fight against liver fluke

Villagers exposed to liver fluke infection in north-east Thailand were advised to pay for diagnosis and treatment. On the basis of the response obtained a project for the control of the parasite in seven provinces has been planned, within the framework of a primary health care scheme.

*Opisthorchis viverrini*, a species of liver fluke, is endemic in north-east Thailand (1). The adult embeds itself in the biliary system and the eggs are passed out in the faeces. The main intermediate hosts are snails of the genus *Bithynia*, while many species of cyprinoid fish are secondary intermediate hosts. Humans, cats, dogs and many fish-eating mammals serve as definitive hosts. These are infected when fish containing metacercariae are consumed raw, and in this connection it should be observed that *koi-pla*, consisting of raw fish, is a very popular dish in north-east Thailand (2). Pathological changes are generally related to the intensity and duration of infection and are attributed mainly to the mechanical irritation caused by the flukes and partly to the toxic substances they produce. The signs and symptoms range from unspecific gastrointestinal disturbances to relapsing cholangitis, cholangiocarcinoma, gallstones and obstructive jaundice (3–5).

---

Mr Mongkolintra is District Health Officer and Dr Leelapanmetha is Director of the District Hospital in the Nam Pong district, Khon Kaen Province, Thailand; Mr Siriwichai is Health Officer at the Nam Pong District Health Office; Dr Siripornpitak and Ms Chauyna are with the Nam Pong District Hospital; Dr Sornmani is Dean of the Faculty of Tropical Medicine, Mahidol University; Dr Fungladda is Acting Head and Mr Srithip, Mr Impand, Mr Mahatuirunkul, Mr Vorasanta and Mr Mas-Ngammueng are staff members of the Faculty’s Department of Tropical Medicine; Professor Schelp, to whom correspondence should be addressed, is with the Department of Epidemiology, Free University of Berlin, Kelchstrasse 31, D-1000 Berlin 41.
Previous attempts to control opisthorchiasis were unsuccessful because no effective drug was available. However, following the recommendation of praziquantel for this purpose (6, 7) a pilot project was conducted in the Nong Wai irrigation area of Khon Kaen province. The most effective approach to the control of *O. viverrini* proved to be a combination of health education and case treatment, reducing the infection rate by 90% (8).

Because finance was not available from the Thai Government or donor agencies for treatment on the scale required in north-east Thailand, where some 7 million of the 16 million inhabitants are infected (9), the Nam Pong District Health Office and District Hospital started a control project within the framework of primary health care, emphasizing self-reliance. The objective was to reduce the rate of infection with *Opisthorchis* by getting the villagers to pay for diagnosis and treatment themselves.

**Methods**

Ten villages comprising 7678 people in 1417 households were selected after the village committees had approved the programme. Three local inhabitants with secondary school education were recruited and were trained for three weeks at Mahidol University so that they could identify parasite eggs, especially those of the liver fluke, in stools. The diagnostic team spent 4–6 weeks in each village, whose inhabitants, mostly under the supervision of village health volunteers, collected their stools in specially supplied containers. Stools from 30–40 persons were examined each day. Meanwhile, health education programmes were launched; posters, exhibitions of specimens, and demonstrations were used to inform the villagers about the life-cycle of the parasite and the mode of infection. Technical supervision was provided by the District Health Office in cooperation with the Faculty of Tropical Medicine at Mahidol University.

Stools were examined free of charge, but villagers found to be infected were expected to pay 40 baht (US$ 1.60) for each praziquantel tablet taken. A single dose consisting of 3 tablets results in a cure rate of over 90% (6, 7), so each infected person had to pay, on average, 120 baht (US$ 4.80) for treatment. This income went to pay for the drug, the salaries of the diagnostic team, laboratory materials, and fieldwork. It was calculated that the project would break even if treatment were given twice and all infected persons paid 40 baht per tablet. The District Health Office was responsible for the financial aspect of the scheme, while treatment was supervised by the District Hospital. On the day treatment was provided, an additional health education programme was organized; this involved displaying specimens and showing video films of liver fluke in the stools of treated persons. Stool examinations were started in July 1985 and the first of two planned rounds of visits was completed in September 1986.

**Results**

Over 85% of the population at risk had their faeces checked (see table); even in the village where cooperation was least, more than 70% of the people had their stools checked; in most villages over 90% of the people participated.

The infection rate varied between villages from 16.7% to 71%. Of the people found to be infected, 70% paid for treatment. At the end of the first round of visits, income and expenditure were almost in balance: the
income from sales of praziquantel and of drugs used against other parasites, mainly hookworms, found when the faeces were examined, amounted to 208,740 baht (US$ 8350), while the cost of drugs, salaries and other expenses totalled 216,295 baht (US$ 8650).

A second round of visits was started in October 1986. Preliminary results showed that prevalence rates had already dropped in most villages to below 35%.

Discussion

The outcome of the project depended largely on whether the villagers were able and willing to pay for treatment. Their purchasing power was rather low but sufficient to justify implementing the project. Where the villagers had to buy the drug, cash income was in the range 8000-15 600 baht (US$ 320-624) (10). Where a high number of villagers were infected but reluctant to pay for treatment, they were asked why this was so. The number of unexpected answers indicated a need for health officials to convince key persons and the villagers in general of the benefits of being cured. One reason was that after taking the drug the villagers expected to see worms in the faeces, as demonstrated in the health education programme. Since this did not usually happen, the belief probably spread that ineffective drugs were being issued. Another mistaken assumption was that there should always be a big difference in clinical symptoms between infected and uninfected people. Where this was not so, the villagers felt that no treatment was necessary. This also tended to be the response when negative results were obtained in stool examinations relating to people who had eaten raw fish, which, the villagers had been taught, could be a source of infection.

In some cases where it was not possible for the villagers to purchase the drug immediately or where the village health volunteers refused to collect payment, the drug was kept in the nearest subdistrict health station so that people could purchase it at their convenience. Especially where several members of the same family were infected, villagers tended to wait until harvesting was over before purchasing the drug because they then had more money. In one village the drug was provided in advance of payment.

The mobile team working in the villages required close supervision. At first, unrealistically low prevalence rates were reported because of a large number of false negative results.

Another problem was that the Ministry of Public Health established three treatment centres in the north-east of the country in response to pressure from the people after it had become known that a suitable drug was available and that a pilot project had been started. The drug was sold at a lower price than elsewhere in these centres because certain costs, including the salaries of the people checking the faeces, were borne by the government. It was necessary to convince the villagers at the Nam Pong project site that travelling to the centres

<table>
<thead>
<tr>
<th>Rates of infection and treatment</th>
<th>No.</th>
<th>%</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals at risk</td>
<td>7678</td>
<td></td>
<td>177-1581$a$</td>
</tr>
<tr>
<td>Stools examined</td>
<td>6620</td>
<td>86.2$b$</td>
<td>73.7-99.0$b$</td>
</tr>
<tr>
<td>Individuals infected</td>
<td>2522</td>
<td>38.1$c$</td>
<td>16.7-71.0$c$</td>
</tr>
<tr>
<td>Paid for treatment</td>
<td>1768</td>
<td>70.1$d$</td>
<td>40.8-97.0$d$</td>
</tr>
</tbody>
</table>

$a$ Range of number of individuals in different villages.

$b$ Stools examined as percentage of individuals at risk.

$c$ Individuals infected as percentage of individuals who had their stools examined.

$d$ Individuals who paid for treatment as percentage of those found infected.
would make the cost of treatment higher than what they had to pay in the project. Also, it was much more convenient for them to have their faeces checked and to be treated in their own villages than it would have been elsewhere.

In general the villagers responded satisfactorily and the programme helped to stimulate additional health-related activities, such as the construction of latrines, the improvement of the nutritional status of preschool children, and the implementation of vaccination programmes.

The pilot project has provided the basis for planning a larger scheme of parasite control which, under the auspices of the Ministry of Public Health, will start in seven provinces in the area of endemicity with a target population of three million.

Acknowledgements

The authors are grateful for support given by the German Agency for Technical Cooperation, Federal Republic of Germany.

References


