

# THE IMPACT OF PRIMARY HEALTH CARE INTERVENTION ON REINFECTION OF SOIL-TRANSMITTED HELMINTHS IN THE COMMUNITY

Chatree Muennoo, Wipa Achwanichkul, Surapol Sa-nguankiat, Somchit Pubampen, Wanna Maipanich, Malinee Anataphruti and Jitra Waikagul

Department of Helminthology, Faculty of Tropical Medicine, Mahidol University, Bangkok 10400, Thailand

**Abstract.** A study to evaluate the impact of primary health care (PHC) practices on the prevention of reinfection of soil-transmitted helminths (STH) was carried out in Nakhon Si Thammarat Province, southern Thailand. Fecal samples from the inhabitants of Ban Paruhas, the implementing village, and Ban Pungsing, the control village, were examined following mass treatment with a three-day regimen of albendazole (400 mg). Training of health volunteers, implementation of a health education program through village broadcasting system and improvements in sanitation including increasing the number of latrines were carried out at Ban Paruhas village. After one year of implementation, prevalence and intensity of STH in both villages were determined using Kato-Katz's method. Pre- and post-intervention stool examination results were compared. The overall prevalence of STH at post-intervention decreased significantly in both villages, with a greater degree of reduction appearing in ascariasis and hookworm infections in the village where PHC was implemented.

## INTRODUCTION

Soil-transmitted helminths (STH) are globally the most abundant parasites causing public health problems concerning nutritional morbidity. Control programs based on chemotherapy had proven to be costly. Coverage and frequency of treatment are the keys to their success. Once the administration of chemotherapeutic agents is ceased, worm burden rapidly increases. Community improvement in sanitation and personal hygiene also played an important role in STH control programs. (Jongsuksuntigul and Imsomboon, 1996)

In Thailand, STH is widely distributed, especially in the south where prevalence is over 90% in some villages. Target treatment in school children twice yearly for 10 years and later on blanket treatment twice yearly for 3 years were not able to control STH infections. Reinfection rate is about 10% (Preuksaraj, 1989; Muennoo, 1993) in children.

To be successful in controlling STH infection, a combination of chemotherapy and PHC should be practiced. Our other study has measured the impact of quarterly chemotherapy on STH infection, at the end of one year the infection had decreased from 93.9% to 56.7% in the treatment village (Waikagul

*et al*, 1994). In this study we will measure the impact of one year's Primary Health Care (PHC) implementation on STH control.

## MATERIALS AND METHODS

### Project areas

Two villages, Ban Pungsing 10 km south of the city of Nakhon Si Thammarat, and Ban Paruhas, 10 km in the north of the city, were selected. There were 111 households with about 600 inhabitants in Ban Pungsing, consisting of fishermen, farmers and labors. Most of the houses are small and only 43% have proper latrines. Ban Paruhas has a population of 1,200 consisting of 218 households. The majority are Moslem (65%) and the rest are Buddhist. Sixty-five percent are fishermen, 25% are labors and 10% are farmers and gardeners. Forty-five percent of the houses have latrines.

Environmental sanitation was poor in the Moslem clusters. For example, garbage was littered on the ground and infested with numerous flies. Some excreta were found along the riverside near their huts. The houses of the Buddhist were farther apart from each other and are located in coconut planta-

tions. A control program of Primary Health Care was carried out in Ban Paruhas whereas Ban Pungsing was used as the control group.

**Public health personnel**

The Village Health Communicator (VHC) is responsible for health related activities in the villages, such as 1) releasing of health information to the villagers, 2) registration of births, deaths, migration, pregnancies, other health program needs, 3) assisting in the implementation of PHC in the villages, and 4) coordinating health activities and joining other activities. One VHC is in charge of 10 households. There is also one Village Health Volunteer (VHV) per village, his/her responsibilities are similar to those of the VHC with the addition of giving services to the public (weighing, supplementary foods in children, common medical care, first aid and distribution of birth control pills and condoms).

**Training**

1) Knowledge on the three geohelminths including transmission and prevention of the diseases, proper environmental sanitation in the village and latrine construction were given to the VHV, VHC, traditional midwives and local health personnel in Ban Paruhas at the beginning of the study.

2) Health education on STH, their mode of transmission and prevention to the villagers of Ban

Paruhas through various mass media (demonstrations, games, posters, videos and discussion) were carried out before stool collection.

**Parasitological study**

Prevalence rates and intensity of STH were determined by stool examination (Kato-Katz's modified thick smear technique) at the first and twelfth month of the study.

1) A single dose of albendazole 400 mg was given to all cases infected with *Ascaris* and/or hookworm. Trichuriasis patients were treated with the same dose of albendazole for 3 consecutive days.

2) At Ban Paruhas, a health education program on transmission, prevention and control of STH was implemented through the village broadcasting system twice a week. The informations and program was prepared by the implementing staff with the coordination of the VHC, VHV and local health personnel.

3) The concept of "Self awareness after health education" with the aim of decreasing STH transmission was introduced to the community. Others activities which were essential for the implementation of PHC such as maternal and child health care including family planning, immunization against major infectious diseases, primary dental health care and mental health in the village which were not properly organized were recreated at the same time.

Table 1

Prevalence rate of *Ascaris*, *Trichuris* and hookworm in villagers at Ban Pungsing and Ban Paruhas at the beginning of the study.

Village (group)	No. examined	No.+ve for STH (%)	No. of infected persons (%)		
			<i>Ascaris</i>	<i>Trichuris</i>	Hookworm
Ban Pungsing	389	323	68	235	267
(control)		(83.0)	(17.5)	(60.4)	(68.6)
Ban Paruhas	802	642	100	498	398
(PHC)		(80.0)	(12.5)	(62.0)	(48.9)

## RESULTS

The prevalence rate of STH at Ban Paruhas and Ban Pungsing as determined by stool examination at the beginning of the study were greater than 80.0%. Infection rates of *Ascaris*, *Trichuris* and hookworm are show in Table 1. Twenty-one days after drug administration, stool examination was carried out to ensure that the population was freed from the three geohelminths. About 10% of the treated cases were repeated.

The effort to give knowledge on soil-transmitted helminthiasis and other health information to the people in the village with the collaboration of the VHV and VHC was successful. There were some changes in both personal hygiene and environmental sanitation at Ban Paruhas. Improvement of

personal hygiene could be observed from their daily behavior more people wearing shoes, keeping food from flies and other insects, washing hands before meals and using latrines. Improvement of environmental sanitation can be seen from the proper disposal of garbage (stored in covered containers and destroyed by incineration or burial), separation of domestic animals from man, and absence of excreta around the house.

Results of stool examination on the last month of the study showed that prevalence rates of soil-transmitted helminths in the two villages had decreased (Table 2). The final stool examination showed that the intensity of infection had decreased, as majority of persons who were still infected were now classified under light infection. However, the change in intensity of infection in ascariasis was not at al significant, as shown in Table 3.

Table 2

Infection rate of *Ascaris*, *Trichuris* and hookworm in villagers at Ban Pungsing and Ban Paruhas one year after drug administration.

Village (group)	No. examined	No.+ve for STH (%)	No. of infected persons (%)		
			<i>Ascaris</i>	<i>Trichuris</i>	Hookworm
Ban Pungsing	374	226	25	161	143
(control)		(60.4)	(6.68)	(43.04)	(38.2)
Ban Paruhas	393	198	12	174	49
(PHC)		(50.4)	(3.0)	(44.2)	(12.4)

Table 3

Percentage of soil-transmitted helminthiasis classified according to degree of infection.

Village (group)	Before treatment (%)									1 year after treatment (%)								
	Trichuriasis			Hw infection			Ascariasis			Trichuriasis			Hw infection			Ascariasis		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Ban Pangsing (Control)	11.9	42.8	45.2	15.2	27.3	57.6	0	0	100	0	32.3	67.7	6.25	12.5	81.25	50.0	0	50.0
Ban Paruhas (PHC)	13.1	63.9	22.9	6.3	6.3	87.5	20.0	40.0	40.0	1.6	24.6	73.8	0	0	100	20.0	40.0	40.0

H : heavy infection; M : moderate infection; L : Light infection

## DISCUSSION

Although anthelmintic drugs can immediately reduce prevalence and intensity of infection in parasite control programs, drug administration will not be successful, however, when environmental contamination and human behavior in the control area is still suitable for disease transmission. Results from this study showed that a control program which is carried out in the context of PHC can be effective. Giving health education to the population continuously will encourage them to improve their personal hygiene habits and increase their awareness of the importance of environmental sanitation which will result in a decrease in STH prevalence rates and degree of infection.

As for *Trichuris* and hookworm infection, the percentage of heavily infected persons decreased from 13.1% to 1.6% and 6.3% to 0%, respectively. Persons whose degree of infection were reclassified from heavy or moderate infection to light infection had increased from 22.9% to 73.8% and 87.5% to 100% for *Trichuris* and hookworm, respectively. Prevalence rate of overall STH had improved from 80.0% to 50.3% (*Trichuris* from 62.0% to 44.2% and hookworm from 48.9% to 12.4%). Reduction in the prevalence rate and a decrease in the number of infected persons in heavy and moderate classes proved that the control program was indeed effective. Regarding *Ascaris* infection, no conclusion can be made since only a few cases of heavy infection were encountered which was due to the very high number of eggs laid by a single female and also the long persistence of eggs in the soil.

Results of this study showed that it is possible to control parasite infections through the Primary

Health Care approach. People can protect themselves from diseases if they know the causative agents, and are aware of means of transmission and prevention methods. Prolonged health education via television is the most effective means (Muennoo *et al*, 1992). Furthermore, certain communicable diseases in the community should be included in the teaching plan of primary schools.

## REFERENCES

- Jongsuksuntigul P, Imsomboon T. Mass deworming projects in Thailand and future plan. Paper presented at Regional Workshop on "Parasitic Infections: Behavioral Change Through Community Participation." September 23-24, 1996, at Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand.
- Muennoo C, Chiamratana B, Sa-nguankiat S, Yaemput S, Waikagul J, Charoenlarp P. Study on prevalence and intensity of soil-transmitted helminths in primary school children, Nakhon Si Thammarat province. *J Trop Med Parasitol* 1992; 15: 31-8.
- Muennoo C, Setasuban P, Sa-nguankiat S. Study on reinfection rate of soil-transmitted helminths in primary school children, Nakhon Si Thammarat province. *J Trop Med Parasitol* 1993; 17-21.
- Preuksaraj S, Jeradit C, Kijvannee S, Kaittansagul S, Nilapan, Manasathitpong N. Study on reinfection rate of soil-transmitted helminths in primary school children. *J Commun Dis* 1989; 15: 351-63.
- Waikagul J, Maipanich W, Muennoo C, Yaemput S, Nontasut P, Pahuchon W. Expelled effect of single and multiple doses of albendazole against *Trichuris trichiura*. *Chula Med J* 1994; 38: 752-60.