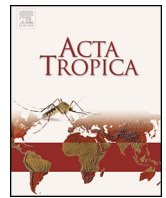




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Perceived illness drives participation in mass deworming campaigns in Laos

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ABSTRACT

Multiple helminth infections are very common in communities of southern Laos. Preventive chemotherapy in combination with health education is the mainstay of control. We assessed the knowledge, perceptions and practices of rural communities related to endemic helminthiasis and their control during a mass drug administration (MDA) campaign. Short interviews with household heads ($n = 192$), direct observations and discussions with attendees of mass drug administrations, and in-depth interviews with local opinion leaders ($n = 21$) were carried out. Quantitative and qualitative data analysis was performed. Results showed that opinion leaders and villagers were well aware of the importance of attending MDA. Leaders perceived the effectiveness of MDA against severe schistosomiasis and appreciated that it was provided for free and in their village. They encouraged villagers to attend it. Anticipated adverse effect of praziquantel was a barrier for participation. A majority of leaders purchased deworming tablet (mebendazole, albendazole) in a local pharmacy for deworming when MDA is absent in their villages (19/21). Most leaders (20/21) had a good knowledge on severe schistosomiasis though only a few of them (5/21) described its cause correctly. They knew little about the disease consequences of liver fluke (3/21) and soil-transmitted helminth (4/21) infections but more about their causes. A high risk for worm infection was observed: consumption of raw or insufficiently cooked fish (100%), frequent physical contacts with Mekong River water (76.0%) and low number of latrines (14.5%). In conclusion, MDA is widely accepted in affected communities. Avoiding severe schistosomiasis was the main motivation to comply. Participation rates increased significantly with drugs provided free of charge in the villages. Better knowledge on the consequences of worm infections and on its modes of transmission will foster the distribution and acceptance of appropriate preventive treatment and other measures in helminth endemic communities. Where multiple infections require several drugs for MDA, preceding health education and information about MDA and its benefits are a prior condition.

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1. Introduction

Preventive chemotherapy campaigns combined with information, education and communication (IEC) are the mainstay of large-scale control of helminthiasis promoted by the World Health Organization (WHO) (Hotez et al., 2006; WHO, 1995;

WHO/HTM/NTD, 2011). WHO recommends that more than 75% of an affected population should attend a mass drug administration (MDA) (Hotez et al., 2006). Several drugs are recommended depending on endemic helminthiasis. In area where multiple helminth infections are prevalent several drugs are used simultaneously, e.g., praziquantel (against schistosomiasis and opisthorchiasis) and albendazole (against soil-transmitted helminthiasis [STH]). Areas of multiple parasitic infections are very common.

Lao People's Democratic Republic (Lao PDR, Laos) is committed to preventive chemotherapy. The National Centre for Malariology, Parasitology and Entomology (CMPE) under the supervision

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of the Ministry of Health is thereby a main body for implementing the corresponding control activities. In the 1980s and 1990s, MDA was carried out in Champasack Province's endemic foci of Mekong schistosomiasis and opisthorchiasis between 1989 and 1999 (Khamkeo and Pholesena, 2003; Montresor et al., 2008; Muth et al., 2010; Urbani et al., 2002). Following the results of national parasitological survey on STH among primary school children in Laos (Rim et al., 2003), a nationwide annual mass treatment against STH in primary school children has been carried out since 2005 (Phommasack et al., 2008). Concurrent helminth infections are very common in the southern provinces of Laos (Sayasone et al., 2007; Sayasone et al., 2009; Sayasone et al., 2011).

The objective of this study was to better understand knowledge, perceptions and practices in communities on helminth control in areas where the prevalence rates of concurrent helminthiasis infections are very high and thus where MDA based interventions require the use of several drugs.

2. Population, materials and methods

2.1. Ethical consideration

Ethical clearance was obtained from the National Ethic Committee on Health Research, MOH, Lao PDR, No 027/NECHR, and the Ethic Committee of Basel-Stadt and Baselland (EKBB 255/06). Informed consent was obtained from interviewees before enrolment.

2.2. Study area

The study was carried out on Donelong Island, Khong District, Champasack Province, in southern Laos. The Mekong island area is the most important source of freshwater fish (including Cyprinoid fish species) in southern Laos. Fishery is the main livelihood together with rice cultivation and livestock (Singhanouvong and Phouthavong, 2002). Widespread rocky banks are suitable habitats for *Neotricula aperta* snail, the intermediate host for *Schistosoma mekongi* transmission (Ohmae et al., 2004). Donelong Island is highly endemic for the Mekong schistosomiasis (Sayasone et al., 2011). Four villages are on Donelong, namely Houalong, Longsong, Longkang and Hanglong (Fig. 1). The total population is 2054 inhabitants (316 households). Most villagers are subsistence farmers and fishermen. The Mekong River is a main water source for household and cultivation activities. Pharmacy and health facilities do not exist on the island. The nearest pharmacy is located in Meaungsen village on the mainland, approximately 30 min by motorboat. The closest health facility is the Khong District hospital which is accessible by motorboat and then by road, roughly within a one hour travel time. There is no drug revolving fund scheme in these four villages.

In Khong District including this island study area *S. mekongi* control started in the 1980s (Muth et al., 2010; Urbani et al., 2002). Several MDA rounds combined with health education were conducted between 1989 and 1999 using a single oral dose of praziquantel and mebendazole/albendazole (Urbani et al., 2002).

In 2006, multiple helminth infections were documented at high prevalence rates on Donelong Island. Infections with *S. mekongi* and *Opisthorchis viverrini* reached 68.0% and 92.0%, respectively. STH were very common (hookworm 76.8%, *Ascaris lumbricoides* 31.7%, *Trichuris trichiura* 25.0%), and *Taenia* spp. (1.8%) (Sayasone et al., 2011) and in addition minute intestinal flukes (e.g., *Haplorchis taichui*) were highly reported (Chai et al., 2013; Lovis et al., 2009). In 54% of the examined Donelong population 3–6 simultaneous

helminth species infections were diagnosed. In addition intestinal protozoa such as *Giardia intestinalis* (3.0%) were detected (Sayasone et al., 2011).

On Donelong Island, profound liver and intestinal morbidity was frequent due to *S. mekongi* infection (Muth et al., 2010). Co-infection with *O. viverrini* aggravated the liver morbidity (Sayasone et al., 2012). In addition bile duct morbidity associated to *O. viverrini* such as dilated bile ducts were frequent and of considerable severity (Sayasone et al., 2012). They are a risk factor for the development of cholangiocarcinoma, a fatal bile duct cancer (Sripa et al., 2011).

2.3. Study population and data collection

Data collection was carried out in June 2007 when an MDA campaign took place on Donelong Island. The research team spent four days and nights in each study village. Three methods of data collection were pursued: (i) short interviews with household heads, (ii) direct observations of attendees during MDA, and (iii) in-depth interviews with key informants (i.e., opinion leaders) such as head of village, village health volunteer, head of Lao Women Union, trained birth attendant, teacher and monk.

All heads of household who have participated in the MDA were interviewed using a pre-tested structured interview form in Lao language. It consisted of the general demographic characteristics of the respondents, household data like household assets, and type of house, risk factors for helminth infections like habit of eating raw or insufficiently cooked fish, possession of latrine, and having contact with the Mekong River like washing, bathing and fishing, and previous participations in deworming campaigns. Each interview lasted for 10–15 min.

During the distribution of deworming medicine, one researcher observed the MDA attendees as well as assessed their willingness to attend the treatment. The discussions during the waiting period before and after receiving the medicine were noted. All collected information about perceived importance of the medicines, their effects on worms and health, and the reasons for MDA participation were recorded. The results of the observations were also written down during the four days in each village. The mass treatment was provided by the district and provincial and central health authorities. Albendazole (400 mg, oral, single dose) and praziquantel (40 mg/kg BW, single dose) was given to all villagers except (i) children below four years of age, (ii) pregnant and breast-feeding women, (iii) people with any sickness on treatment day, and (iv) persons under tuberculosis and epilepsy treatment.

In-depth interviews with opinion leaders of each village were performed. The interviews followed a pre-tested and pre-established discussion guide consisting of questions related to knowledge on MDA, on risk factors for helminth infections and on relationship between infection and disease, and to the perceptions and practices with respect to deworming in the community. Each interview lasted for 30–45 min. The physical presence and availability during the survey days decided on whom the research team could interview.

2.4. Data management and analysis

Quantitative data was entered into EpiData freeware (www.epidata.dk). Descriptive analysis was performed with SPSS program (version 11.5). Qualitative data from the individual interviews were transferred into a notebook in Lao language and restored in full sentences after each interview. Interesting statements were directly quoted. All field notes were typed into a MS Word document in English. Subsequently, themes related to the general objectives of the study were marked. Information collected through direct observation was summarized daily. The interesting ideas and discussions among MDA attendees were

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