



Awareness and knowledge of schistosomiasis infection and prevention in the “Three Gorges Dam” reservoir area: A cross-sectional study on local residents and health personnel

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ABSTRACT

Background: Schistosomiasis is a severe public health problem in China. It has been predicted that the ecological changes caused by the “Three Gorges Dam”, the world’s largest hydropower project, could potentially aggravate the spread of schistosomiasis in the area. This study focused on investigating (a) local residents’ knowledge on the potential risks of schistosomiasis and (b) the capability of local health personnel in preventing schistosomiasis.

Materials and methods: A quantitative survey combined with qualitative interviews was conducted in three counties of the reservoir area during November and December 2008. A total of 1386 inhabitants and 180 local health personals participated in questionnaire survey; 18 inhabitants, 21 health professionals, and 8 local government officials were interviewed.

Results: Of the surveyed inhabitants, 66.3% had no access to safe drinking water; 47.9% had water-contact regularly through farming or swimming; 58.7% did not have hygienic toilets; and only 13.7% used methane for energy. Besides, only 3.8% of the inhabitants had knowledge scores higher than 6 points within the range 0–10. Educational level, occupation and income were significant predictors of knowledge score ($P < 0.05$). Only about 5% of the inhabitants had some knowledge on schistosomiasis. Among health professionals surveyed, 6.7% had college or higher education; 26.7% had prior schistosomiasis control experience; 75.6% did not receive any relevant training in the past year; and only 52.2% had basic knowledge of schistosomiasis. The logistic regression analysis identified occupation and time at work as significant factors to their knowledge level ($P < 0.05$). Moreover, the surveillance work was often severely hindered by a shortage of funding, and challenged by monitoring of migrant population. There were very limited training opportunities for the health workers, and almost no health education for inhabitants, if any, neither efficient nor effective.

Conclusion: Although there were multiple risks for potential *Schistosoma japonicum* infections in the study area, the knowledge level on schistosomiasis and surveillance was relatively low both in local residents and health personnel. Thus, more health education and professional training are urgently required to local residents and health personnel, respectively. By considering limited activities in surveillance and health education been implemented, a strategy plan on intervention to ensure a stronger inter-sectoral cooperation is recommended in order to reduce schistosomiasis transmission risks in this area.

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1. Introduction

Schistosomiasis is one of the most popular parasitic diseases worldwide. It is estimated that 779 million people are currently at risk of schistosomiasis, among which 13.6% living in irrigation areas or within close proximity to large dams. The management of water resources is a crucial element in schistosomiasis

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THE THREE GORGES DAM RESERVOIR

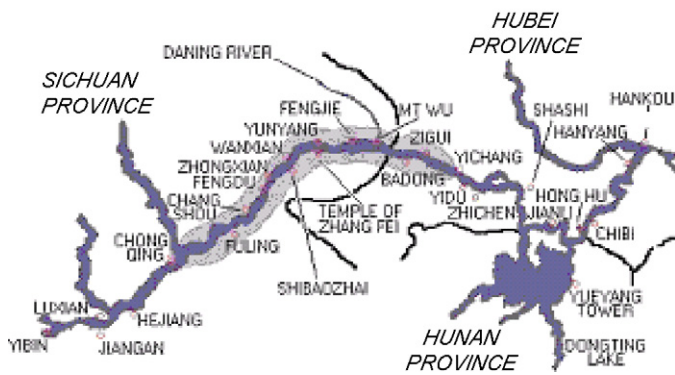


Fig. 1. A map of the “Three Gorges Dam” reservoir area.

control (Steinmann et al., 2006). Transmission of schistosomiasis has resulted from several large-scale hydro-projects, e.g., the Gezira-Managil Dam in Sudan, the Aswan Dam in Egypt, the Melka-sadi Dam in Ethiopia, the Danling and Huangshi Dams in People’s Republic of China (P.R. China) (Ross et al., 2001). The “Three Gorges Dam”, cutting the Yangtze River at Sandouping, Hubei, China, is the world’s largest hydropower project. It also sets a record in migration of people (about 1.4 million had to move out of this area). The Chinese government considers the project as a social and economic success, and an accomplishment in reducing greenhouse gas emissions. However, along with its benefits came dramatic ecological changes, which increased the risk of diseases (Zheng et al., 2002). It was predicted that Three Gorges Dam could considerably affect the distribution and transmission of schistosomiasis (Yang et al., 2005; Seto et al., 2008; Zhu et al., 2008), especially those in the “Three Gorges Dam” reservoir area, including four counties in Hubei province and fourteen counties and seven districts in Chongqing.

Chongqing, located in southwest China, has a large population (31.4 millions). About 60% of the city’s population are rural residents. Schistosomiasis in this area was not reported as an epidemic before, but since the building of the Three Gorges Dam, the risk of schistosomiasis transmission is increasing. An ecological trial study, conducted during 2002–2003 within the “Three Gorges Dam” reservoir area, indicated that *Oncomelania* snails, the host of *Schistosoma japonicum*, could live and breed in the changed ecological environment (R.B. Wang et al., 2003; W.B. Wang et al., 2003). Chongqing is surrounded by Hunan, Sichuan, and Hubei provinces where frequent schistosomiasis epidemics occur (see Fig. 1). Surveillance found that people infected with *S. japonicum* could serve as a transmission source when moving from schistosomiasis epidemic areas. With increasing material needs of Chongqing locals, each year there is a large amount of agricultural products transported from these three neighbouring provinces. *Oncomelania* snail could be imported through these products from the three provinces. Therefore, there is a high risk of schistosomiasis epidemic in the “Three Gorges Dam” area (Xu et al., 2004). Prevention of schistosomiasis requires the efforts of local public health workforce which should be equipped with experienced professionals. However, up to now, there is no published report in regard to professional training or education on schistosomiasis prevention provided to health personnel in this area. We conducted a quantitative survey and qualitative interviews to (a) understand residents’ awareness, knowledge and the potential risks of schistosomiasis and (b) identify the weakness of and challenges faced by the local government and health professionals in dealing with the disease.

2. Materials and methods

2.1. Study sites

Three counties, Wanzhou, Kaixian and Yunyang in the “Three Gorges Dam” reservoir area were selected for the study based on the following criteria: (a) the area is located on the shores of the Yangtze River or on its main tributary, thus facing a higher risk of *S. japonicum*; (b) the area can represent the natural and social environment of the “Three Gorges Dam” reservoir area; (c) the health authorities in this area are willing to participate in this study.

2.2. Data collection

After selecting two townships in each of the three counties, one village was chosen in each township. In each village, random cluster sampling was used to select two groups, each with up to 300 residents. Inhabitants in these two groups were given survey questionnaires at their homes by postgraduate level researchers. As in the qualitative study, in-depth interviews were conducted with eighteen inhabitants, seven public health professionals from local Centre of Disease Control (CDC), two managers, seven physicians, five health practitioners from township hospitals, and eight local government officials.

The questionnaire used for local inhabitant included 40 questions: 11 on demographic information (e.g., age, gender, and income); 5 on sanitary conditions (e.g., “do you use tap water” and “do you have disinfected toilet at home”); 10 about knowledge on infection source and route of schistosomiasis (e.g., “what is the infection source of schistosomiasis” and “how do people infect schistosomiasis”); and 14 on potential risks and attitudes on schistosomiasis (e.g., “do you raise cattle” and “do you have water contact”). The questionnaire for health personnel consisted 25 items: 9 on demographic information, 10 on knowledge and training of schistosomiasis prevention, and 6 on the current status of schistosomiasis prevention work. For the qualitative study, we adopted topic-guided interviews, which covered responders’ perceptions on the disease and health education being received, difficulties in and suggestions on schistosomiasis prevention. Data were collected from November to December 2008.

2.3. Data analysis

EpiData 3.0 was used in data management and SAS 8.2 for statistical analysis in this study. Participants’ knowledge level of schistosomiasis prevention was scored by calculating the number of positive answers from 10 related items in the questionnaire. These scores were further dichotomized into binary variables: more or less than 6 scores. Descriptive and univariate analyses were conducted before applying Chi-square test and logistic regression models to find the relationship between variables.

As for the qualitative interviews, firstly, conversations were audio-taped and transcribed, then the researcher read through the transcriptions, highlighted recurring viewpoints and summarized them into certain themes (e.g., “risk factors”, “surveillance”, “knowledge” and “awareness” of schistosomiasis), which made up the “thematic framework”. Secondly, transcriptions were imported into software MAXqda and coded using the “thematic framework”. Finally, the coded segments relevant to each theme were gathered in a chart for data synthesis (Liz et al., 2003).

2.4. Quality assurance and consent procedure

Firstly, the study protocol was reviewed and approved by the Institutional Review Board of Chongqing Medical University, and all the data were collected after the participants had signed

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