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Mass drug administration and the sustainable control of schistosomiasis: Community health workers are vital for global elimination efforts

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ABSTRACT

Objectives: Schistosomiasis control is centred on preventive chemotherapy through mass drug administration (MDA). However, endemic countries continue to struggle to attain target coverage rates and patient compliance. In the Philippines, barangay health workers (BHWs) play a vital role in the coordination of MDA, acting as advocates, implementers, and educators. The aim of this study was to determine whether BHW knowledge and attitudes towards schistosomiasis and MDA is sufficient and correlated with resident knowledge and drug compliance.
Methods: A cross-sectional survey was conducted in 2015 among 2186 residents and 224 BHWs in the province of Northern Samar, the Philippines using a structured survey questionnaire.
Results: BHWs showed good familiarity on how schistosomiasis is acquired and diagnosed. Nevertheless, both BHWs and residents had poor awareness of the signs and symptoms of schistosomiasis, disease prevention, and treatment options. There was no correlation between the knowledge scores of the BHWs and the residents ($r = 0.080$, $p = 0.722$). Kruskal–Wallis analysis revealed significant differences in BHW knowledge scores between the low (3.29, 95% confidence interval 3.16–3.36), moderate (3.61, 95% confidence interval 3.49–3.69), and high (4.05, 95% confidence interval 3.77–4.13) compliance village groups ($p = 0.002$), with the high compliance areas having the highest mean knowledge scores.
Conclusions: This study highlights the importance of community health workers in obtaining the World Health Organization drug coverage rate of 75% and improving compliance with MDA in the community. Investing in the education of community health workers with appropriate disease-specific training is crucial if disease elimination is ultimately to be achieved.

Introduction

Schistosomiasis, also known as bilharzia, is a neglected tropical disease (NTD) that ranks only second to malaria in terms of human suffering in the tropics. It is endemic in 78 countries, with an estimated global burden of 3.514 million disability-adjusted life years (DALY) in 2015 (WHO, 2016a; WHO, 2016b). Schistosomiasis control is centred on preventive chemotherapy through mass drug administration (MDA) with 40 mg/kg praziquantel, as endorsed by the World Health Assembly in 2001. This control strategy aims to reduce morbidity and mortality, and prevent new infections by limiting transmission through the reduction of the human reservoir (Humphries et al., 2012).

More than 15 years after that endorsement, endemic countries still struggle to meet the target coverage of at least 75% of school-age children. In 2015, only 12 out of 40 reporting countries had achieved coverage rates greater than 75% (WHO, 2017). Adequate drug coverage is necessary for morbidity control, reducing transmission, and ultimately disease elimination (Worrell and

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Mathieu, 2012). Studies on lymphatic filariasis and onchocerciasis have shown that if coverage rates fall below 65%, it is still possible to achieve disease elimination if MDA is extended for several years (Bockarie et al., 2013). In order to achieve sustainable disease control, community awareness and involvement is vital (Sady et al., 2015). In countries such as Tanzania and Yemen, where inadequate knowledge on schistosomiasis continues, the prevalence of the infection remains high despite the implementation of MDA (Sady et al., 2015; Mazigo et al., 2010).

Several studies have assessed awareness among adult and school-age populations in schistosomiasis endemic areas. Although a high level of familiarity with the name of the infection has been shown, this awareness has often been limited to just having heard the name (Sady et al., 2015; Dawaki et al., 2015; Mwai et al., 2016). Poor knowledge of disease transmission, prevention, and treatment has been observed in Nigeria, Mozambique, and Kenya (Dawaki et al., 2015; Mwai et al., 2016; Rassi et al., 2016). The most common misconception is that schistosomiasis is acquired by drinking or eating contaminated food and water (Acka et al., 2010; Kabatereine et al., 2014; Musuva et al., 2014; Odhiambo et al., 2016; Person et al., 2016). Others believe it is transmitted through sexual contact (Rassi et al., 2016; Mwanga et al., 2004).

Community health workers (CHWs) are a common source of schistosomiasis information in rural communities. Unfortunately, insufficiency of such manpower is a problem and may limit the coverage of health education campaigns (Leonardo et al., 2016a). Community members, specifically neighbours, family members, and friends, are other common sources of information in countries such as the Philippines, China, Mozambique, and Nigeria, where more than 70% of respondents to a recent survey identified them as key informants (Dawaki et al., 2015; Rassi et al., 2016; Ferlyn et al., 2015; Zeng et al., 2011). CHWs are generally defined as non-professional lay health workers, who are originally from the community, and who are requested to provide promotional, preventive, and sometimes even curative health care services to their own community (Ma et al., 2017). The use of CHWs in Nigeria to disseminate information on tuberculosis has improved overall knowledge and attitudes of the community about the disease (Balogun et al., 2015). In Uganda, CHWs have been involved in promoting health for children under 5 years of age, and this has resulted in reduced malnutrition and morbidity, and improved child health practices (Brenner et al., 2011). CHWs have also been found to be effective in disseminating information in control programmes for NTDs such as trypanosomiasis and onchocerciasis (Corley et al., 2016).

In the Philippines, barangay health workers (BHWs) are the counterpart of CHWs. The Department of Health describes a BHW as a person who has undergone training programmes under any accredited government or non-government organization, and who renders primary health care services after having been accredited to function as such by the local health board (Philippines DoH, 2017). In the implementation of schistosomiasis MDA activities, BHWs are tasked with assisting in listing the eligible population and mobilizing the community to participate in the MDA. It is necessary for the community to have adequate and correct information in order for them to participate in such activities (Parker et al., 2008). However, an assessment of the capability of BHWs to carry out their role as community advocates and educators has not been performed. Similarly, there has been no study to determine whether BHW knowledge and attitudes has had any impact on the residents of the community. The aim of this study was to determine whether BHW knowledge and attitudes towards schistosomiasis and MDA are sufficient and correlated with resident knowledge and patient drug compliance.

Methods

Study design and study area

In 2015, a cross-sectional survey was conducted among residents and local MDA service providers in the endemic municipalities of Laoang and Palapag, in the province of Northern Samar, the Philippines. Northern Samar was ranked fourth among the poorest provinces in the country, with a poverty incidence of 47.9% in 2015 (Philippine Statistics Authority, 2016). Most household heads are engaged in rice farming, and family incomes are lower than the national average. A national prevalence survey conducted in 2008 estimated the prevalence in endemic provinces to range from 0.08% to 6.3%, and Northern Samar ranked fourth with a prevalence of 2.4% (Leonardo et al., 2012). A 2012 parasitological survey at the study site found a human schistosomiasis prevalence of 27% (Ross et al., 2015). Acute respiratory infections, diarrheal diseases, and other communicable diseases are also very common (Ross et al., 2015).

Study procedures

The survey was conducted among 22 endemic barangays. Residents aged 18 years and older were selected randomly from a list of all eligible residents for each village using the 'sample' command in STATA SE version 13.1 (StataCorp, College Station, TX, USA). The number of selected individuals from each barangay was proportionate to the size of the population. All BHWs were also interviewed. Prior to the start of the survey, intensive training covering the overview of the protocol, methods of inviting study participants, obtaining informed consent, and administering the interview questionnaire was given to local interviewers. During the data collection period, the interviewers visited the households of the selected residents to obtain their consent and to conduct the interview. The BHWs were interviewed at their local barangay health stations.

An extensive review of previous studies on knowledge and attitudes towards schistosomiasis was conducted and used as the basis in developing the structured questionnaires, which were then translated into the local dialect Waray. This was back-translated into English to ensure that the meaning of the questions remained the same after translation into Waray. The questionnaire was pre-tested among a subset of residents who did not participate in the survey. The section on 'knowledge' included questions on the signs and symptoms of schistosomiasis, and how schistosomiasis infection can be acquired, diagnosed, treated, and prevented. The respondents were not given the answers to choose from, but were encouraged to give their own answers. In the 'attitudes' section, respondents were asked to rate their own risk, as well as the community's risk of becoming infected, with possible answers of none, low, moderate, or high risk. They were also asked to rate the severity of the disease as low, moderate, or high. Their perceptions of the benefits of MDA were also assessed by asking them to rate their agreement to various statements.

Data management and analysis

A customized Microsoft Office Access 2007 data entry system was developed for data processing. Field supervisors reviewed all completed questionnaires before the data were encoded using a double-entry system. Data were cross-checked for errors after encoding. The software STATA SE version 13.1 (StataCorp, College Station, TX, USA) was used for data checking and analysis. Comparison of the knowledge and attitudes between residents and BHWs was done using mixed-effects logistic regression analysis, with random barangay effects in the model to account