

Schistosomiasis and intestinal helminth infections in Sengerema district, Tanzania: sociological and epidemiological approaches

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Abstract: Schistosomiasis and intestinal helminth infections are common health problems among the people of Lake Victoria basin particularly in Mwanza region, Tanzania. A cross-sectional questionnaire survey and observations were conducted among 100 participants to describe their perceptions and practices in relation to schistosomiasis and intestinal helminth infections. This was further complemented by parasitological examinations. The study revealed that the prevalence of *Schistosoma mansoni* was 42.5%, hookworms 48.9% and protozoan intestinal infections 55.3%. The sociological part of the study revealed that generally perceptions of study participants in relation to schistosomiasis were in congruous with their hygiene habits and practices. Although the informants' awareness and risk perceptions with regard to schistosomiasis were high, it was not reflected in their hygiene habits and preventive measures. Health communication activities based on non-traditional health education models such as empowerment model need to be established and sustained for the development of action competence among the people of this community to effectively control their common infections.

Key words: schistosomiasis, intestinal helminth, perceptions, practices, Tanzania

Introduction

Schistosomiasis and intestinal helminth infections constitute major public health problems among the people in the Lake Victoria basin in north-western Tanzania. The morbidities due to intestinal helminth infections and schistosomiasis in the area are known to be very high (Kardorff *et al.*, 1997; Muro *et al.*, 2000; Lwambo *et al.*, 1992, 1999). Studies carried out in Tanzania have shown that soil-transmitted helminths occur sympatrically with schistosomiasis over most parts of the country (Kihamia, 1981, Lwambo *et al.*, 1992, 1999, Brooker *et al.*, 2000).

While there have been a number of biomedical studies on schistosomiasis and intestinal helminth infections in the Lake Victoria basin, only a few have underscored the importance of the role of human behaviour and health education in their transmission and control among the communities in other endemic areas (Lwihula, 1985; Nguma & Lwihula, 1986; Huang & Manderson, 1992; Kloos, 1995). Moreover, research on local perceptions and practices related to these infections is largely lacking and that biomedical studies give only a partial picture of a health problem. Therefore, poor knowledge of the disease and inappropriate treatment and control, appear to contribute to its continued transmission. The knowledge of local perceptions and practices of the people in relation to schistosomiasis and intestinal helminth infections are indispensable in the planning and execution of a successful control programme.

Without knowledge of social and cultural aspects as well, one can fall into farcical errors in designing interventions (Robert *et al.*, 1989).

The assumptions that individuals have the means to make desirable behavioural changes (Janz & Becker, 1984) has increasingly been criticised as unrealistic, especially in developing countries. In addition, the expanding field of health promotion goes beyond the traditional health education concern with individual behaviour, and lifestyles and takes into consideration both social and economic conditions which affects people's health (Jensen, 1997; Jensen *et al.*, 2000). The objective of this study was to determine perceptions and practices of the people with regard to schistosomiasis; hygiene habits in relation to water; and parasitological status of the study of the rural community of Sengerema district, Tanzania.

Materials and Methods

Study area

The study was carried out in Sengerema district (2° 7'S and 32° 30'E) located in the Lake Victoria basin in north-western Tanzania. Kasomeko village in Katunguru Ward was selected as a study area mainly because of its proximity to putative transmission sites, the Lake Victoria. The study participants were drawn from six sub-villages of Mabatini, Isakulilo, Bugando, Mtakuja, Kungule A, and Kungule B. The sample size was conveniently or purposively determined, and the sampling procedure was such that in each sub-village

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the study participants were recruited from two neighbourhoods (comprising of twenty households). One member was admitted into the study from each household. The total sample size consisted of 100 people. Study participants were 7-75 years old. All participants received information on the nature of the study and their informed consent to participate in the study was obtained prior to collection of their urine and stool specimens, and other data. The confidentiality of their responses was ensured.

Study design

A cross-sectional descriptive study was carried out among the study participants. A detailed questionnaire with both closed and open-ended questions was administered to the study participants in Kiswahili (the national language). Apart from soliciting socio-demographic characteristics of the study participants, the questionnaire also covered issues of water and hygiene practices, and knowledge on awareness, causes, symptoms, mode of transmission, treatment and prevention of schistosomiasis as well as risk perception.

After an interview, each participant was asked to provide urine and stool specimens in two separate plastic containers labelled with personal identification number for parasitological examinations. A 10% formalin solution was added to the specimens as preservative immediately after their collection in the field. The specimens were then taken to the Mwanza Medical Research Centre's laboratory for relevant tests. In the laboratory, the urine specimens were examined for *Schistosoma haematobium* using sedimentation technique, whereas, the stool specimens were examined for hookworms and protozoan intestinal parasites using formal-ether concentration method. The samples were then examined qualitatively under the microscope for presence of parasite ova and/or cysts.

Data analysis

Responses to open questions were manually categorised; coded and together with responses to closed questions were entered into a computer by two independent investigators for validation using DBase IV+ programme. For data analyses STATA Version 8 software (Stata Corporation, College Station, Texas 2003) was used. Descriptive data set from parasitological examinations was presented as prevalence of parasitoses among the examinees.

Results

Of the 100 study participants 45% were males (mean age= 33 years) and 55% were females (mean age= 29 years). Sixty-seven percent of the participants had at least primary education (34 males, 33 females) and 22% of participants had no formal education (5 males and 17 females). The remaining 11% consisted of those who attained adult education, secondary and post-secondary education levels.

Peasantry was reported as the main occupation for both male and female participants (74%). Other occupations included fishing (9%), pupils (9%) and those employed (8%). Christianity was the dominant religious faith among the participants (69%), followed traditional religions (25%) and Moslems (6%). A good number of the participants (63%) were married.

Our findings showed that Kasomeko villagers had mainly two sources of water, Lake Victoria (reported by 62% of the participants), and unprotected wells (reported by 38%). In this community, fetching water was predominantly a female activity (reported by 91% of participants). Usually water was fetched in the mornings between 6 and 8 a.m., although a few participants reported to fetch water between 4 and 6 p.m. Seventy-five percent of the participants reported not to boil water before drinking. Furthermore, 55% reported to take bath in the lake. Washing of clothes was mainly done in the lake as well, and this was a predominantly female activity. Washing was reported to take place 2-4 times per week, preferably between 8 a.m. and 4 p.m. Although a considerably higher proportion of participants (90%) reported to have latrines at home, 85% also reported to either defecate and / or urinate indiscriminately during their daily activities and particularly when they come into contact with water. Other reported water contact activities involved wading in the lake (54.7%), working in rice fields (71%), and swimming in the lake (62%).

The prevalence of parasitoses among the study participants for *S. mansoni*, *S. haematobium* hookworms and protozoan intestinal infections ranged from moderate to high (Table 1). Although 83% of participants had heard of schistosomiasis, the disease was considered to be of public health problem by only 45%. Fifty-five percent of the participants mentioned other diseases and conditions such as malaria, worm infestations, diarrhoeal diseases, and abdominal pains of various types, hepatitis/jaundice, leprosy, malnutrition, sexually transmitted diseases including HIV/AIDS, scabies, eye infections, meningitis, and acute respiratory infections.

Table 1: Prevalence of parasite infections among the study participants (N= 100)

| Infections | No. Examined | No. Positive | | Total Prevalence (%) |
|--|--------------|--------------|--------|----------------------|
| | | Male | Female | |
| <i>S. mansoni</i> | 94 | 23 | 17 | 42.5 |
| <i>S. haematobium</i> | 95 | 1 | 0 | 1.0 |
| Hookworms * ¹ | 94 | 19 | 27 | 48.9 |
| Protozoan intestinal infections * ² | 94 | 24 | 28 | 55.3 |

¹ Hookworm species unidentified.

² Include *Amoeba histolytica*-5, and *Giardia lamblia*-1)

Participants had multiple sources of information on schistosomiasis such as relatives, health staff, friends/peers and media, particularly the radio. Slightly more than half of the study participants (58%), reported to know someone who has had suffered from schistosomiasis and in most cases it was a close relative or neighbour, whereas 38% of the participants reported to have ever suffered from schistosomiasis themselves.

Apart from participants' levels of knowledge on causes of schistosomiasis a few participants mentioned that schistosomiasis is a hereditary disease and others went further to mention that the disease is contracted through sexual intercourse. Although a few participants considered schistosomiasis to be sexually transmitted, they did not perceive it as a stigmatising condition.

The majority (64%) of the respondents knew at least 1-3 symptoms of schistosomiasis. Only a small

The risk perceptions with regard to schistosomiasis were considerably high (Table 2).

Participants clearly indicated that the lake, rivers, streams, ponds and unprotected wells were risky as far as schistosomiasis infections were concerned. With regard to prevention, only 2% of the informants mentioned more than three correct preventive measures whereas, half of the informants (50%), mentioned between 1-3 correct ways of prevention of schistosomiasis, and slightly less than half of the informants (43%) either did not know or mentioned ways totally unrelated to the prevention of schistosomiasis.

Discussion

It is apparent that most of the Kasomeko villagers in Sengerema district rely upon water from Lake Victoria for various uses. This dependency on the lake coupled with their unsanitary water use habits such as drinking

Table 2: Perceived risk of schistosomiasis infection among the community of Sengerema (N=100)

| Source of water | Risky | | Not risky | | Do not know | |
|------------------|-------|--------|-----------|--------|-------------|--------|
| | Male | Female | Male | Female | Male | Female |
| Lake | 42 | 52 | 2 | 2 | 1 | 1 |
| Rivers | 40 | 48 | 3 | 5 | 2 | 2 |
| Streams | 43 | 53 | 2 | 1 | 0 | 1 |
| Pond | 45 | 54 | 0 | 1 | 0 | 0 |
| Unprotected well | 40 | 50 | 4 | 3 | 1 | 2 |
| Protected well | 0 | 0 | 44 | 54 | 1 | 1 |
| Communal water | 0 | 0 | 45 | 55 | 0 | 0 |

proportion (16%) did not know any symptom of the disease. Eighty percent of the participants believed that schistosomiasis can be cured by modern medicine, and 78% mentioned death as a serious consequence of schistosomiasis if it is left untreated for a long time.

unboiled water and indiscriminate urination and defecation, put them at a greater risk of schistosomiasis, hookworms and protozoan intestinal infections. This means, in such situations, it is unrealistic to keep people away from contact with

water because their lives are at stake. However, people could be persuaded to avoid unnecessary water contacts by minimizing activities such as washing, taking bath and swimming in the lake. It has been suggested that contacts with water during early mornings or late evenings when cercariae densities are low carry minimal risks of infections. Furthermore, using soap when taking bath may reduce chances of getting infected with schistosomiasis because of the cercaricidal effect of the soap (Jordan & Webbe, 1982). Prevalence figures for parasitosis among the participants in this study are in agreement with previous studies on schistosomiasis and intestinal helminth infections reported by Mugashe *et al.* (1995). As one moves close to the Lake Victoria, *S. mansoni* and hookworms infections become more prevalent whereas *S. haematobium* infection become less prevalent.

Our findings have shown that the hygiene habit of community is reflected in their parasitological status in the sense that it was possible to relate the prevalence of the infections to their behaviour and activities. Interestingly more than half of the participants did not perceive schistosomiasis as among their important health problems. This raises a crucial concern regarding control interventions. Control interventions in relation to a specific disease are more difficult when the disease is not perceived as a major health problem and, therefore, risk factors are not considered important (Olsen *et al.*, 2001).

It was striking to find that very few participants specifically mentioned snails as the cause of schistosomiasis. This is in agreement with the commonly held views that schistosomiasis is a 'man-made disease' (McCullough, 1973; Dalton, 1976; Dunn, 1979), in the sense that in the first place it is not snails, which should be implicated, but human unsanitary behaviour, which is responsible for introducing schistosome eggs in water and then the whole schistosomiasis life-cycle begins. The study also revealed that slightly more than half of participants associated the cause of schistosomiasis with contacts with small organisms found in water. This knowledge provides a good starting point for understanding what schistosomiasis really is. People usually differentiate between the 'practical life-cycle' and biological life-cycle of schistosomiasis. The practical-life cycle, when someone with schistosomiasis (bloody urine/bloody stool) urinates/defecates in water, others who swim or stand in the water, or wash clothes, will get infected. The

'biological life-cycle' of schistosomiasis is the one, which shows the commonly known life-cycle of eggs from the urine/stool of an infected person developing into miracidia, which get into snail, which develop cercariae and which penetrate the skin of a person. Experience has shown that children of school-going age and many adults relate much better to the 'practical life-cycle' of schistosomiasis, and that if they are taught this first, they will be able to relate more easily to the 'biological life-cycle'.

Although awareness and risk perception of schistosomiasis among participants was high, it was not reflected in hygiene habits and preventive measures undertaken. Moreover, informants' knowledge of the causes and symptoms of schistosomiasis was moderate, and some participants had local perceptions of causes of schistosomiasis. The perceptions held, for instance, by a few participants that schistosomiasis is a hereditary condition has also been documented in Malawi (Kamwendo *et al.*, 1987). On the other hand, the perception that schistosomiasis is sexually transmitted has also been reported in Nigeria (O.C. Nwaorgu, unpublished; Cameroon (Robert *et al.*, 1989) and Tanzania (Mwanga *et al.*, 2004, Mwanga, 2005).

The fact that participants were fairly knowledgeable on the mode of transmission of schistosomiasis provides ways of prevention points and the need for establishing and sustaining health communication activities using an empowering education model advocated by Freire (1973). The acquisition of health knowledge and taking actions is emphasised as it signifies a process of learning to identify solutions to health problems that can be put into practice in local contexts; learning about disease prevention; healthy practices for children, families and communities as well as the promotion of harmonious relationships between social groups and the environments in which they live. Health knowledge should provide skills that empower people to take actions, which will result into care of their own and others health (Jensen, 1997). However, it should be pointed out that attempts to reduce schistosomiasis infection among the people in this community should consider reducing hookworms and protozoan intestinal infections. In order to reduce the re-infection rates after treatment, it is recommended that the people of Kasomeko and other villages in Lake Victoria basin should be provided with alternative affordable sources of clean and safe water such as protected wells.

Acknowledgements

We extend our sincere gratitude to the people of Kasomeko village in Sengerema district for their generosity and co-operation. This study received financial support from the European Union.

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