Low awareness of intestinal schistosomiasis in northern Senegal after 7 years of health education as part of intense control and research activities

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Summary
We evaluated the awareness of and knowledge about intestinal schistosomiasis in a highly infected rural community of northern Senegal where a variety of health information and education activities had taken place for 7 years as a component of different research and control programmes. As the infection had been introduced only recently, an initial ‘zero’ knowledge can be assumed. Most of the health education activities had been performed with adapted messages through local health and community workers. By a questionnaire, 566 individuals were asked simple questions on symptoms, mode of transmission, the sources of information and health-seeking behaviour. About 86% of the respondents stated that they knew what schistosomiasis was, and 92% that in case of illness they would seek treatment at the health centre. However, only half of the people accurately quoted symptoms associated with intestinal schistosomiasis: diarrhoea, abdominal pain and bloody stools. The majority of respondents realized that the disease was somehow linked with water and (lack of) hygiene, but only 44% of respondents reported water contact as the source of infection. Ultimately, only 30% of the respondents gave adequate answers about both symptoms and mode of transmission. We conclude that even intense and long-lasting education efforts for a specific and straightforward problem as schistosomiasis are not enough to have profound impact on the knowledge of rural traditional communities.

keywords intestinal schistosomiasis, northern Senegal, health education, control programme, questionnaire survey

Introduction
After the construction of the Diama dam (completed in 1986) in the delta of the Senegal River Basin, the area experienced an unexpected epidemic of intestinal schistosomiasis (Talla et al. 1990, 1992). The first cases with Schistosoma mansoni infection were found in the city of Richard Toll (northern Senegal) in 1988 and thereafter the number of cases rose dramatically in all the surroundings. The lack of safe water supply, poor sanitation, intense human water contacts and high density of the vector host (Biomphalaria pfeifferi snails) resulted in a very intense transmission. Subsequent epidemiological studies conducted in the area revealed extremely high prevalences and intensities of S. mansoni infection (Stelma et al. 1993; Gryseels et al. 1994). Since 1992, the number of cases with schistosomiasis disease that reported in the health system has risen dramatically (Sow et al. 2002).

Over the past decade, we conducted in-depth epidemiological studies in one traditional community village in the epicentre of the epidemic, Ndombo, situated near the city of Richard Toll and along the same canal (Gryseels et al. 1994). A wide variety of cross-sectional and longitudinal studies took place, ranging from immuno-epidemiological and ultrasound-based clinical studies to a 3-year long, village-wide water contact study (Stelma et al. 1993, 1994, 1997; Gryseels et al. 1994; Kardorff et al. 1996; Van Dam et al. 1996; Guissé et al. 1997; Thomas et al. 1997; Yazdanpanah et al. 1997; Burchard et al. 1998; Van Lieshout et al. 1999).

At least half of the population was examined and treated in clinical and parasitological surveys; all inhabitants had access to diagnosis and treatment in the local health centre. Each study was accompanied by extensive information and education campaigns, through various public channels: schools, religious meetings, community meetings and the local health services. Most of these activities were assured by the district and village health and community workers in the local language (Wolof) with appropriate messages. Several survey team members actually lived in the village.
Investments were made in specific matters, e.g. a new sound system for public and religious messages, film evenings and strengthening of the local health centre. Apart from the treatment offered to survey participants, the health centre was provided with drugs and training to treat or refer patients.

In 1994, a regional schistosomiasis control programme was launched which also covered Ndombo, based on health education, strengthening health services and the distribution of praziquantel through intensified passive case detection and targeted community actions. Through various ways of information – billboards along roads, posters in villages (Figure 1), radio and television messages, community meetings, training of local health and community staff, activities of the local health centre – people with symptoms associated with schistosomiasis were encouraged to visit the local health services to be tested and treated. A recent evaluation showed that the level of training, equipment and supplies in the health centres had been satisfactory and the programmes successful in this respect (Van der Werf et al. 2002). The current study aimed at assessing the perception and measuring the level of knowledge about intestinal schistosomiasis in the general population.

Materials and methods

Study area and population

The study was carried out in Ndombo, situated along the Taouey canal, which at the nearby city of Richard Toll joins the Senegal River with an inland lake (Lac de Guiers). The canal and a meandering marshland are the main sources of water supply for this population. The village is endowed with a functional and well-equipped health centre run by a competent nurse and community health workers. The study was performed in 1998 during an evaluation phase of the control programme.

School children were recruited from the single primary school existing in the village. During the study, 240 were present of 300 pupils enrolled in the school. Initially, the same number of adults were randomly selected from the general population, but due to social sensibilities we interviewed more than planned (326 instead of 300) adults. In contrast to the children, most adults were illiterate.

The questionnaire survey

A simple questionnaire was developed about the perception and awareness of intestinal schistosomiasis, which largely responded to the messages, conveyed through the health education programmes. Open-ended questions were asked about the knowledge of intestinal schistosomiasis, its symptoms and mode of transmission, the source of information about the disease, the perception of its severity, and general health-seeking behaviour. Respondents were not prompted with possible answers, and multiple answers were allowed for symptoms and mode of transmission. In the local school, the school teachers administered the questionnaire to their pupils, after proper explanation. The school teachers were not interviewed themselves. For the adults, the questionnaire was administered in local language by properly trained interviewers with at least secondary school education, recruited among the villagers.

For analysis, the responses were stratified into: ‘adequate’ when the answers were consistent with the health education messages; ‘incorrect’ when no answer was
given or when it had nothing to do with intestinal schistosomiasis; ‘unclear’ when they combined adequate and incorrect answers. Chi-square tests were used to test age and sex differences on reporting.

Results

About 86% (484/566) of the respondents reported that they knew what intestinal schistosomiasis was, in the vernacular language called Bilaadios. This was reported more often by adults than by children (90% vs. 80%, \(P < 0.001\)), and more by males than by females (90% vs. 81%, \(P = 0.002\)). Most people cited other sources of information than the regional health education programme tools, with the majority of respondents reporting to know about schistosomiasis through the research project (64%) or friends and relatives (12%). Only few people referred to media (4%), and none mentioned the billboards or posters as a source of information. The remainder (20%) did not remember the source of information. The disease was regarded as severe by almost all (95%) interviewees; 2% answered that malaria was more severe and 3% considered the disease to be benign. Concerning health-seeking behaviour, the large majority (92%) of the interviewees reported that, if they had schistosomiasis, they would seek treatment at the local health centre. Only few mentioned other medical facilities, such as self-healing (4%) and traditional healer (3%).

The symptoms to which people referred varied considerably. Of 798 answers given, abdominal pain (223 times, 28%), diarrhoea (216, 27%) and bloody stools (116, 15%) were most often mentioned. Various symptoms usually not associated with schistosomiasis (and not part of the health education messages) were also reported (30%): fever (84 times), fatigue (34), bloated stomach (30), headache (29), vomiting (29), weight loss (22), itching (11) and constipation (4). While about half (54%) of the respondents gave an adequate answer (diarrhoea, abdominal pain or bloody stools), many added one or more non-schistosomiasis related symptoms (15%). Thus, 69% could mention at least one correct symptom. The remainder gave only incorrect answers (10%) or could not mention any symptom at all (21%). Males gave more often adequate answers than females (60% vs. 48%, \(P = 0.004\)) and there was no significant difference between age groups (58% for children vs. 51% for adults, \(P = 0.094\)) (Table 1).

The 456 answers on mode of transmission could be grouped into three main categories: ‘water contact’ (271 times), ‘drinking of dirty water’ (53) and non-water-related sources of infection such as ‘presence of garbage’ or ‘flies’ (132). Less than half of the respondents reported water contact as the only mode of transmission (43%), together with some who added an incorrect answer (4%). The other respondents gave only incorrect answers (28%) or no answer (24%). Adults gave more often an adequate answer on mode of transmission than children (57% vs. 25%, \(P < 0.001\)) (Table 1). Within the children this pattern was also visible, with 35% of the oldest group (11–16 year, \(n = 109\)) giving an adequate answer compared with 17% of the youngest group (7–10 year, \(n = 131\)) (\(P = 0.005\)).

Table 1

<table>
<thead>
<tr>
<th>Reported knowledge</th>
<th>Children</th>
<th></th>
<th>Adults</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>All</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>‘Ever heard of schistosomiasis’</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Adequate*</td>
<td>60.9</td>
<td>53.9</td>
<td>59.4</td>
<td>45.2</td>
<td>54.2</td>
<td>60.9</td>
<td>53.9</td>
</tr>
<tr>
<td>Unclear</td>
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<td>6.7</td>
<td>17.4</td>
<td>16.5</td>
<td>14.8</td>
<td>15.2</td>
<td>6.7</td>
</tr>
<tr>
<td>Incorrect</td>
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<td>39.3</td>
<td>23.2</td>
<td>38.3</td>
<td>30.9</td>
<td>23.8</td>
<td>39.3</td>
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<tr>
<td>Mode of transmission</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate†</td>
<td>26.5</td>
<td>22.5</td>
<td>63.0</td>
<td>52.7</td>
<td>43.5</td>
<td>26.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Unclear</td>
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<td>1.1</td>
<td>7.2</td>
<td>2.1</td>
<td>4.4</td>
<td>6.6</td>
<td>1.1</td>
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<tr>
<td>Incorrect</td>
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<td>76.4</td>
<td>29.7</td>
<td>45.3</td>
<td>52.1</td>
<td>66.9</td>
<td>76.4</td>
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<td>Symptoms and mode of transmission combined</td>
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<td>Both adequate</td>
<td>19.9</td>
<td>19.1</td>
<td>40.6</td>
<td>34.0</td>
<td>29.5</td>
<td>19.9</td>
<td>19.1</td>
</tr>
<tr>
<td>Both adequate or unclear</td>
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<td>21.3</td>
<td>59.4</td>
<td>43.6</td>
<td>40.8</td>
<td>31.8</td>
<td>21.3</td>
</tr>
</tbody>
</table>

* ‘Diarrhoea’, ‘abdominal pain’ or ‘bloody stools’.
† ‘From the water’ or ‘from the stream’.
There was no gender-related difference for any of the age groups ($P = 0.813$).

Only 30% of the population sample (20% of children and 37% of adults) gave adequate answers on both symptoms and mode of transmission (Table 1). Similarly, 41% gave at least one correct (so, adequate or unclear) answer to each of both questions. This was 28% of children and 50% of adults.

**Discussion**

The present investigation does not pretend to be an in-depth sociological study, nor a formal evaluation of a well-planned health education campaign. In fact, this study was initiated as part of an internal assessment, but the results are striking enough to be presented to a wider audience. No pre-intervention study was performed; however, as the infection and the disease were not at all known or present in the area before 1990, the initial knowledge can be assumed to have been virtually non-existent.

Irrespective of above considerations, we can safely conclude that a large part of the target population has not acquired an appropriate level of knowledge about schistosomiasis symptoms and mode of transmission, in spite of many years of efforts in control and research. As the village of Ndombo has experienced most and quite intense educational efforts, the situation in the rest of northern Senegal can only be less satisfactory. The 30% with adequate knowledge about both symptoms and mode of transmission is much less than the initial 86% who answered yes to the question: ‘Have you ever heard of intestinal schistosomiasis?’ As it often happens in questionnaire surveys, answers may be given to please the interviewer or to prevent a suggestion of ignorance. In this light, we should also not be too optimistic about the fact that the large majority of the respondents declared to seek treatment at the local health centre when having schistosomiasis.

Many of the information and education activities had focused on health-seeking behaviour (Figure 1), rather than behavioural changes, as it was believed that as long as water supply and sanitation were not improved, such messages would not be useful. In this respect, 54% adequately reporting symptoms (or 69% reporting at least one correct symptom) are perhaps better – and more optimistic – measures of how well the health education messages came across. Nevertheless, transmission was extensively explained and related advice was always given. Indeed, a large proportion of the respondents realized that the disease is somehow linked with water and (lack of) hygiene, but their comprehension of the mechanism of transmission was muddled. Ndamba et al. (1989) reported similar findings in Zimbabwe. Reporting water as mode of transmission did increase with age. This may represent an increase in specific knowledge about schistosomiasis, but it may also, more generally, reflect a rising experience with or awareness of health risks associated with water. It is also interesting to note that many school children in our study reported the presence of garbage or flies as mode of transmission. This may may very well be explained by the fact that garbage collection was a main concern and political item in the community during the period of interviews. Poor knowledge on sources of transmission among children is considered a factor of concern, as in this group water contact behaviour and infection rates are generally highest (Schall 1998; Useh & Ejezie 1999).

As follows from the reported sources of information, the epidemiological research project which has operated in the area since 7 years before the interviews has played a crucial role in increasing the knowledge on schistosomiasis, although its aim was not to perform health education. The health education messages by radio spots, video films, billboards and posters appeared to have had a minor impact on the community. Perhaps the messages were not gripping enough. This puts forward the limited impact of general messages, hence, intensive community-based actions are more effective. Some of the respondents acknowledged that information on schistosomiasis was conveyed to them through family members or other persons. This indicates that community social organizations may act as a good intermediary to deliver health education messages. The school teachers can also be associated in health education training in school programmes and through community social infrastructure. In communities with high illiteracy rates, school children can act as agents for the diffusion of health education messages (Schall et al. 1987; Schall 1987). In Brazil, Uchoa et al. (2000) found in a sociological survey that school was also reported as a source of information on schistosomiasis.

Despite sustained control efforts and intensive research actions, intestinal schistosomiasis is still an unclear disease for many residents of Ndombo. The weak awareness of intestinal schistosomiasis in a focus where it is part of daily life is intriguing, but it shows the limits of schistosomiasis control through the classical health education model. Moreover, knowledge and perception do not necessarily lead to behavioural change: e.g. even if the awareness about the risk of infection with schistosomes is improved, people still resort to streams for their domestic water supply if no alternative is presented (Kloos et al. 1986; Kloos 1995; Yuan et al. 2000). Hopefully, the more acceptable level of knowledge of the symptoms may lead to health-seeking behaviour and early treatment at health care facilities, thereby contributing to morbidity control.
(Andrade & Bina 1985; Taylor et al. 1987; Polderman & De Caluwé 1989; Butterworth et al. 1991; Mehanna et al. 1997). Regarding the outcome of our study, the acquired basic notions of schistosomiasis are fairly small, but they may improve as the epidemic and control efforts go on. Also, the socio-economic upgrading due to the dam (which initially caused the epidemic) and subsequent agricultural development, may further raise the overall educational level of the population.

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References


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