

A Pedagogical Approach of Schistosomiasis – An Experience in Health Education in Minas Gerais, Brazil

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The experience described here is part of an extensive program that aims to stimulate schools to develop health integrated projects from theme generators, i.e., themes that have a meaning for the community. It was developed in Jaboticatubas, a town in the metropolitan region of Belo Horizonte, capital of the state of Minas Gerais, Brazil, and the focus was schistosomiasis. The selection was based on the expressive and historical prevalence of this disease in the county, which has been known as the “capital of schistosomiasis”, in a national press release since the 1960’s. Schistosomiasis is also a theme pointed out by teachers as requiring more information and methodologies to work with their students, most of them living in areas of high risk of transmission. In addition, during the last years, this disease has been transmitted silently through an increasing rural tourism in that region, requiring integrated and effective control actions. The developed strategy included four schools, whose teachers, students, and families took part in the process. It emphasizes in a critical pedagogy approach, which focuses on health issues as themes that may mobilize the school community and awake the population to a work which integrates environment, health, and citizenship. The results demonstrate that teachers and students not only acquired new knowledge and methodological skills, but also gained confidence in their ability to improve their health conditions. Thus, the project promotes a critical education that can result a more permanent effect on the control of schistosomiasis as well as other benefits for the schools and for the population.

Key words: schistosomiasis - health education - schoolchildren - Minas Gerais - Brazil

The continuity and expansion of schistosomiasis areas in Brazil may not be explained only as a biological phenomenon, requiring the understanding of historical, social, political, and cultural processes involved in its maintenance as it was pointed out by Barbosa et al. (1996). In spite of the advances on the knowledge of the disease and the consecutive control programs, with a consequent reduction of prevalence of severe forms, in some regions it is still possible to observe an expansion of the transmission area. Today, schistosomiasis control is carried out based on two features: first, the morbidity control that means the reduction of severity especially avoiding or reducing the appearance of the severe form of the disease that compromises the liver and other organs. Second, the transmission control, which reduces the human and snail infections and aims to interrupt the parasite’s cycle, to which the treatment is insufficient (Katz & Peixoto 2000). On the other hand, the re-infection is a fact and it shows that the control may not be confirmed only with the reduction of the parasite burden. This situation is a challenge to reach strategies to achieve better and longer results in control programs of this disease. A significant environmental contamination reduction is necessary through the improvement of public services, hygiene con-

ditions and a greater commitment of the governments and of the population to both helminths transmitted through water and those transmitted through soil. Health education and sanitation have important roles to reach these goals and may offer more effective opportunities to obtain long-lasting results. All over the world, one of the turning points of these programs is the participation of schools and communities in the endemic disease control.

METHODOLOGY

Schistosomiasis in schools - Implementing a critical pedagogical approach - The school and the community are strategic points for the success of health promotion and contribute to prevent and control diseases. Teachers and students are active agents to introduce new concepts in the community, as they are their permanent members. In accordance to Regis et al. (1996), the school was a privileged place to obtain the involvement of the population of Recife in the control of filariasis. Due to its representativeness, the school atmosphere offers favorable conditions to changes of attitudes and new alternatives to individuals and communities. Most of the families belong the school community and this makes it easier the introduction of the theme and its follow-up.

This approach based on generating themes or words, according to Paulo Freire method, favour a critical education and stimulates the development of a conscious citizenship. The critical pedagogy proposed by Paulo Freire (1994) involves reading the world through reading the text. Thus, the students can read texts through their social contexts and they can reach a better understanding of the context through a critical reading. This critical pedagogy is a form of politics, teaching students how to situ-

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ate their everyday lives and culture in the social and political context where they live. Thus, Health Education was included in schools as a generator of new knowledge, of political reflection and perception of new paths for a better quality of life. Therefore, the working up of an integrated project to control schistosomiasis and other helminths was based on the work with teachers, students and their families of four schools of São José de Almeida, county of Jaboticatubas. The project consisted of meetings with teachers, municipal authorities of health and education interviews with professionals of these areas and with students, and a sample of family members.

After choosing schistosomiasis as the theme, the program involves four phases as: (1) updating the prevalence of the disease among teachers, students, and their families; (2) treatment of people infected; (3) prevention through education, including a course for teachers and a follow-up and supervision of projects developed by schools. These alternatives stimulate the education process continuity and sustainability, motivating teachers to integrate the theme to others related to health and environment (Massara et al. 2003); (4) improving access to water and sanitation facilities and health services. Phases 1 and 2 were described by Massara et al. (2003). Phase 3 is being partially described here and phase 4 is under way.

Included in phase 3, as pre-requirements for pedagogical measures, the social representations of the students about schistosomiasis were also investigated and analyzed (Diniz et al. 2003). After that, schools were motivated to develop integrated projects by means of meetings with supervision teams and teachers. These integrated projects allowed a successful pedagogical approach to health and environment as transversal subjects in a perspective of a health promotion school (Gavidia Catalan 2001). A qualitative follow-up of the projects has been carried out through focal groups with teachers.

Study area - The county of Jaboticatubas has been known for more than 50 years as the “capital of schistosomiasis” (O Cruzeiro 1962) and the need to construct a correct and critical knowledge is very important to promote an integrated and participative control of the disease and deconstruct this label.

Jaboticatubas is located 64 km from the capital, Belo Horizonte, and belongs to its metropolitan region. It has a territorial area of 1113 km² in the region of Serra do Cipó and a population of 13,530 inhabitants (IBGE 2000), of which two thirds are located in the rural area and devote themselves to farming and cattle-raising; mainly fruit and vegetable cultures.

It is located in the metallurgic area and is part of Belo Horizonte’s mesoregion and Sete Lagoas microregion. The county has one district, São José de Almeida; with 10 health care centers in the rural area, one emergency care center and one hospital in municipalization process.

The county is qualified for “Gestão Plena de Atenção Básica à Saúde” (Full Attention Management to Basic Health), counting on two teams of “Programa de Saúde da Família” (PSF) (Family Health Program). In accordance to an initial survey and diagnosis, malnutrition in 0 to 5-year-old children and pregnant women, was a serious problem (Prefeitura Municipal 1998).

The choice criterion of schools was guided by Funasa’s reports (Fundação Nacional de Saúde – National Foundation of Health), in São José de Almeida’s district, as they indicated the presence of infected snails and some foci of high prevalence of schistosomiasis.

Schools -The work was carried out in four schools, two in the district of São José de Almeida, one in Cipó Velho and another one in São José da Serra (these two areas are part of Serra do Cipó region, a great tourism complex in Minas Gerais State).

Escola Estadual Dr. Eduardo Góes Filho (in the district of São José de Almeida), is located in the center of the district and functions in three periods with students of all social classes and villages in the region, totalizing 1010 students in primary and high schools (2001). Escola Municipal Paulo Rodrigues Aguilar, in the same district functions in two periods with students mainly from the rural area, totalizing 280 students from primary school (2001). Escola Municipal Padre Candinho, in Cipó Velho, a smaller school, has 92 students (2001). Most of them are children of parents who work in ranches or farms or are owners of small properties, and have subsistence agriculture and animal husbandry in domestic scale. A school bus maintained by the City Hall is responsible for taking the students to school and taking them back home. Escola Municipal Benfica Moreira Marques, in São José da Serra, is the most distant from the district of Almeida, and implies going along a road without asphalt for 10 km. It is located in a community that lives almost exclusively from tourism (owners of camping areas, restaurants, bars, and inns). It operates in two periods with 84 students (2001). Altogether, the project includes 1566 students, and their families, with an estimation of more than 4500 people, around 35% of the county’s population.

Project’s methodology and development - Since 2001 the research team has started to work in partnership with schools, observing a very promising participation. In the first phase of the project, teachers showed an excellent cooperation with activities concerning diagnosis and making students aware of the importance of providing material for fecal examinations. The teachers also played an essential role in providing valuable information to identify areas at risk of disease transmission and where the vector mollusks could be found. Following the perspective of participation research the team rented a house in the district in order to intensify the relationship with the schools and the community (Brandão 1981). This approach contributed enormously to integrate the project in the community.

In a second phase, the commitment to establish projects about health in partnership with schools was reinforced through the course “Educação em Saúde para o Controle da Esquistossomose” (Health Education in the Control of Schistosomiasis), given to 33 teachers from the four selected schools (Massara 2003).

The purpose of this course was to inform how to construct knowledge and to stimulate these educators to act as multipliers in cooperation with their colleagues, their students within the community. The discussion about the ideas of the critical pedagogy (Freire 1994) was followed by practical classes using diverse active learning tech-

niques related to schistosomiasis issues, always having in mind a problem-solving pedagogical approach. In addition to learn basic concepts of the disease such as cycle, transmission, pathology, diagnosis, treatment and prevention, all four schools received a kit of materials to work with.

This kit included a videotape with information about the disease (Rozemberg 1995); a collection of shells of transmitting mollusks; the book: *O Feitiço da Lagoa*, of the series *Ciranda da Saúde* (Schall 1986); worm samples (*S. mansoni*, *Taenia* sp., and *A.lumbricoides*); tongs and gloves. Furthermore the kit included a Manual do Agente de Saúde Pública – Esquistossomose (Handbook of the Public Health Agent – Schistosomiasis) and Guia Texto – Esquistossomose mansoni (Text Guide, Schistosomiasis Mansoni), both published by Fundação Nacional de Saúde (Ministério da Saúde, Health Ministry); a brochure about collection of mollusks' and identification of cercariae, organized by Massara et al. (2002), with the cooperation of Laboratório de Helmintoses Intestinais (Laboratory of Intestinal Helminthiasis) and Laboratório de Educação em Saúde (Laboratory of Health Education) and two folders about water and health – Projetos e Ações Integradas (Integrated Actions and Projects) – a handbook for teachers, health professionals and community leaders, – Saber para Prevenir (Knowing in order to Prevent) – both published by Schall (2002).

Theoretical classes were carried out with lectures of invited experts in each study area related to the theme. Practical classes followed these lessons with the purpose of enriching and substantiating this new knowledge. In a dynamic process the teachers were requested to ask questions about schistosomiasis which later on guided the contents, and were covered during the course. Some workshops (Miranda 1995) were used to enhance this dynamic process.

The specific content of the lectures included historical aspects of the disease in Brazil, the current situation in the country and the biological cycle of *S. mansoni*. The teachers seemed to be very interested in the classes and most of them reported their experiences with the disease, or the experience of friends and family members. During the practices boxes with mollusks of the *Biomphalaria* genus, that transmit schistosomiasis were compared with other boxes containing mollusks that do not transmit schistosomiasis (Fig. 1). It was explained to the students how mollusks should be collected, packed, labeled, and sent to the laboratory for analysis. Experimentally infected snails were examined with a stereomicroscope, under artificial light or by crushing in order to observe the presence of cercariae. Other kinds of cercariae were shown to compare size, tail bifurcation and morphology.

In other classes, notions were given about diagnosis, emphasizing Kato-Katz quantitative method (Katz et al. 1972). In the practical part each participant had the opportunity to prepare two slides with their own fecal material. Pre prepared positive slides were brought from the laboratory to observe eggs of *S. mansoni* and other helminths through microscopes (Fig. 2).

After a lecture about the symptoms, treatment, cure, and re-infection, given by the team's physician an open



Fig 1: presentation of boxes with mollusks of *Biomphalaria* genus, schistosomiasis vectors species and other mollusks which are not associated with the disease.

discussion clarified issues which were raised by teachers. This activity was enriched by statements about their own experience with the disease or experiences of their families.

The results obtained with the research in phase 1 (Massara et al. 2003) were presented to the teachers and included data about disease prevalence in students and their families, percentage of families who have access to sewage system, water system (with the use of filter), dry or septic tank (and its location), electric energy and the destination of their garbage frequency and reasons of water contact with water of local creeks, number and location as well as the percentage of infected snails collected with the percentage of infected ones. Consequently the partnership with the health care center as a reference for periodic exams and treatments, with teams of Programa de Saúde da Família (Family Health Program) and residents of the rural internship program of Faculdade de Medicina (Medical School) of UFMG was improved.

The team's pedagogue also presented results of her master's dissertation about the social representation of the studied group which was developed in that area (Diniz et al. 2003). The students perception about the disease was not based on the knowledge obtained through health education in schools, but very much on information of parents and teachers "learned" in campaigns during the period when schistosomiasis was a more serious problem than it is today. These results showed the importance of informal education, which happens during daily interactions and the misinformation of traditional methodologies transmitted in schools. They also lined out the need of researches in the area of prevention, and sanitation and the need of involvement of authorities and the community. The teachers training program also included discussions about: (a) models of integrated projects in Health Education, which give priority to focus on the students' reality, permitting a better understanding of requirements and problems and emphasize a participative construction of knowledge; (b) formulation of questions about the dis-

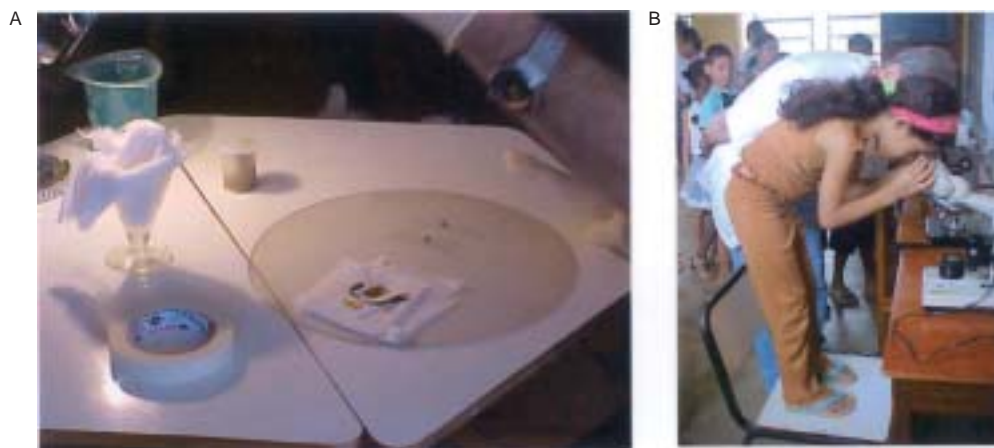


Fig. 2A: class about the Kato-Katz quantitative method (Katz et al. 1972), in which each teacher had the opportunity to prepare a slide with their own fecal material. Positive slides were set and placed in microscopes to observe eggs of *Schistosoma mansoni* and other helminths; B: students observing eggs and larvae of *S. mansoni* in the microscope.

ease and its transmission; (c) perspectives of the critical pedagogy and the importance of schistosomiasis as a generator which may motivate reflections about the environment, the water issue, citizens rights, and public policies in the city; (d) elaboration of a project which can be used as a roadmap for the students; (e) the need for an explanatory analysis of schistosomiasis in the region, identifying and investigating the forms of transmitting the disease and its relationship to the environment and people's lifestyles.

Furthermore there were prioritized strategies for projects that guarantee the involvement of students and the observation of their habits, interviews with families (to register data and write down reports), creation of a newspaper or magazine to reveal the results, collective creation of stories of their own community, organization of science fairs, contest among schools which included family members and the establishment of a plan of sanitation improvements (Fig. 3).

It was also found necessary to develop a plan for evaluation of the project, preferably with the support of the local authorities (Health and Education Departments), of local non-governmental associations, and of the families.

A point of great interest during the practice in the course was the dissection of experimentally infected mice and their comparison with not infected ones. This enabled to show the difference between animals with pathology alterations caused by the disease, with especially alterations of infected mice's livers and the presence of worms in these animals (Fig. 4). This exercise increased the degree of perception about the severe forms of the disease and the attention to control it, as verified in focal groups later in the process.

The course also provided the opportunity to discuss environment issues with special focus on sanitation. Data about the general situation in Brazil were presented, including information water supply service (98% of the counties are assisted by same sort of water supply and only 64 % are run by the public system. Less than 50% of the



Fig. 3: activities with teachers and students in the classroom (A) and in the field (B)

counties have sewage system and in 85%, the sewage is direct into rivers without treatment.

The debate about relation of several diseases with a lack of sanitation generated ideas to review proposals, actions and interventions in order to minimize the problem.

The course included explanations about several forms of sewage treatment, its methodology, as well as information about the construction of different kinds of tanks (dry or septic), their costs, advantages and disadvantages.

Finally, the course ended with the definition and the development of projects to be realized in the schools dur-



Fig. 4: dissection of experimentally infected and not infected mice. This enabled the comparison between animals with pathological alterations of the disease and the observation of the presence of worms in these animals with the help of a stereomicroscope.

ing the second semester of 2003. Teachers who would be responsible for the process in each school were identified.

The continuation of the project in 2004 was undertaken through focal groups including teachers and students of the four schools. This was done in a way to stimulate the continuity of pedagogical process and integrated projects.

RESULTS

The project is still ongoing. However some results, allow us to verify the potential of community mobilization through school for joint participative work. During the course, teachers illustrate the potential of this alternative approach as lined out by the following statements:

Taking part in the course increase my knowledge and I acquired new (and much information) that I didn't know before. Therefore, I needed to continue studying about the subject, because I will have a greater and better base in sensibilizing people (students, students' families, and the community in general) about the importance of the matter: transmission, causes and consequences. I didn't imagined that this subject could be so interesting. It was important that it was still unknown to us, opinion makers for others, fighting for citizenship... (Teacher A)

I will try to use the acquired knowledge to make people aware of the importance of this subject. I'll be able to apply this knowledge in the social field in which I work (family, school, school community; community through Associação Comunitária, Projeto Manuelzão, and Conferência São Vicente de Paula). In all of them we try to help people improve their living conditions and have good health. I'll be able to use certain resources: lectures, movies, technical visits, informative folders, search for partnerships and others. (Teacher H)

I intend to do my best to collaborate with the community, families and school. I'll try to help the community with my knowledge working with students, establishing projects, giving lectures and performing other activities. (Teacher E)

After the course, the teachers developed several projects with the students which included a large variety of class and extra-curricular activities. One of the teach-

ers expressed the possibilities of integrating health issues in all curricular subjects, as she states:

It was possible to include health in everything: Mathematics, Portuguese, History, Geography, globalization, sciences, and even into religious teaching, we developed a project about this issues and we worked them within the range on, of the new words they were discovering. (Teacher D)

Big event was organized at the end of the year to present the projects that were carried out during 2003. Some families participated in the event as well as the team of researches which received all produced and presented material for analysis. Since then the team has been able to follow-up the project through focal groups. The teachers have continued the activities developing several projects, field observation trips and environmental interventions thus mobilizing the community. Some of these activities focused on water preservation, collection of separated garbage, and city tours, which all together showed the commitment and participative nature of these activities.

Specifically in the area of schistosomiasis, there are interesting reports of teachers and students who point out more positive attitudes concerning personal health habits and prevention of the disease. In the group of people involved, a greater perception and understanding of the risks of the disease was observed, which result in the search for diagnosis, including the teachers' families, this is referred in the focal groups, as follows:

They already observed a lot, before getting into the water they look out for snails, my children too. We live near a creek and they always say, "watch out for snails" even when they play. (Teacher H)

I read a book with the children in the classroom called "O menino e o rio" (The boy and the river), I was reading and on the cover of the book there was a paunchy boy. I didn't say anything about schistosomiasis and when I was in the middle of the chapter they said "it is schisto". (Teacher N)

It is really remarkable because this year, without getting into the subject, I wasn't even thinking about it, when we started working on "Projeto da Água" (Water Project), I wrote Good Water and on the other side of the board Bad Water. Then each of the students, one by one, had to

write down one word under these two groups. When it came to Bad Water, the first word was "schisto" and then they wrote poems and almost all of the poems about the Bad Water had something to do with schistosomiasis, and that means they didn't forget it. (Teacher R)

Another statement of one of the teachers in the focal group emphasizes this issues:

I think that our medical and sanitary conditions are precarious and also the population is poor. The poorer the population the more difficult for us to work. That's why I think the work we're developing here is very good and serious and it makes people know about cases and makes them aware of how bad the disease is. Many people asked for examination stop us on the streets and asked us how to do it, you know. (Teacher V)

There is also a greater attention to environmental issues concerning transmission, which arose a comment of one of the schools supervisor:

Had an intervention of this cope started 10 years ago, perhaps the disease could be under control today.

DISCUSSION

All 33 teachers involved pointed out the importance of taking part in the project, emphasizing their previous difficulties in dealing with the issue, not only based on the lack of understanding the process but also because of few informative material available. They did not feel motivated to work this topic with their students and they did not have any experience in organizing participative projects involving them and their families. Until them, everything was limited to science fairs at the schools.

Thus, it is remarkable that from the theme schistosomiasis it was possible to generate multiple approaches and educational features which involve health issues, their impact on the construction of a healthier environment and the possibilities of changes in behavior, as well as the consequences on the rights and duties of each citizen.

From a scientific point of view, the course made it possible for the participating teachers to achieve a better understanding about the disease and related issues, such as pedagogical alternatives to work with the students, not only restricted to written papers and posters.

It has been possible to discuss with the teachers the structural problems which maintain schistosomiasis in the county, by remembering and representing its history and its relation to the living conditions of the population. It was possible to observe the irregularity of the distribution of different groups of risk, the relation of the productive process with the transformation of the environment as well as of the society which contributed in the maintenance of the disease. The change from the agricultural system of small farmers by transforming their properties in to leisure and rural tourism areas (Enk et al., 2003) has generated discussions about the urgent need for measures to control the disease by the local public authorities together with the inhabitants. These features associated with stimuli from other projects that are taking place in the region such as "Projeto Manuelzão" (UFMG) have induced several pedagogical actions, associated with projects to enlarge the knowledge of the community, ini-

tiating extra-curricular activities such as informative parades, visits to local water springs, collection of separated garbage. Discussions about risk of deforestation, which surpass the focus on the disease and emphasize health promotion. These aspects define the characteristics of the Healthy School (Gavidia Catalan 2001), makes it visible that the project is heading into this direction.

The participating teachers felt more confident and better equipped to work this issue with the students. At the same time, the students showed much more interest in the work developed in schools, specially with integrated projects and practical activities such as mice dissection, identification of vector and non vector mollusks, as well as worms in their larval and adult stages.

The project assessment has shown a wide range of creativity from the part of the teachers and students. Among the activities developed in the projects, we may emphasize the interest for the problem calling more attention to the environment next to their households and the community surroundings.

During classes, songs, poems, plays, texts were elaborated elaboration, which are currently analyzed. The use of knowledge acquired during the course is applied in more specific subjects such as Mathematics, Portuguese, Geography and History, making health into an integrating and transversal theme.

It is important to register that the elaboration, coordination and implementation of the project integrated the team and satisfied all participants. The invited experts who gave lectures during the course unanimously mentioned the teachers' interest and concern in taking part and clarifying their doubts in order to feel prepared for their future work withing the school community.

Today, these teachers who participated in the course and in the projects are key persons to introduce the issue in the curriculum and to build knowledge together with , students, families and other teachers. Furthermore, they have stimulated a critical reflection within the community about the relationship between health, the environment and quality of life. They did not only acquire new knowledge and methodological skills, but also gained confidence in their own ability to improve their and their students health conditions.

At the moment, the coordination team is using the, strengthening pedagogical bases through focal groups with teachers and students to continue the work in 2004, project step by step a tool for critical education and transformation in the county.

This project has been a reference for the region and other counties which already have declared their interest. As a result, in 2003, two other counties joined the project and others are scheduled to participate in 2004, indicating the achievement of the general goal to develop an applicable methodology for other endemic regions in the state.

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