

# Information and Education in Schistosomiasis Control: an Analysis of the Situation in the State of Minas Gerais, Brazil

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*This paper presents the main ideas discussed in the round-table "Social and Educacional Aspects of Schistosomiasis Control", during the VII International Symposium of Schistosomiasis. Considering the perspectives of schistosomiasis control in Brazil, it is described the example of the State of Minas Gerais, where the disease has been registered for more than seven decades. The importance of an extensive evaluation is now more important, considering the recent change in the Brazilian health system, since the Federal responsibility for the tropical diseases control programs have been replaced by the municipalities coordination. In this way, it is urgent to develop effective alternatives to assist the municipal staffs in the control task. In the specific case of health education, one observes a wide gap between the planned objectives and what is in fact carried out. Instant objectives and the utilization of traditional techniques prevail, which do not take into account the active participation of the population involved. Based on the authors' experience in the scientific and health education, the paper analyzes: (1) some data from a case study in the metropolitan region of Belo Horizonte, which presents the social representation and perception of schistosomiasis by the population; (2) an analysis of 35 different informative and educative materials used in Brazil since the sixties, and (3) some recommendations resulted from the studies that were carried out.*

Key words: science education - health education - science and society - schistosomiasis - Minas Gerais - Brazil

For almost 18 years our group has focused on the education of children and young people, in partnership with schools of the public education network and with the collaboration of teachers. Although our work is rooted in the prevention of diseases and promotion of health, our objective is to stimulate the construction of knowledge since infancy, a fundamental age for the implantation of a body of knowledge that can be translated into attitudes and patterns of behavior, both at the individual and collective levels. Such actions may lead to the avoidance of risk situations and the protection of health, stimulating active participation in movements for the general improvement of the quality of life. As suggested by Valla and Mello (1986), "a school can be a place where everyone discusses health, since there are many opportunities for the students, teachers, the parents and the residents to assemble".

This work has as its orientation: (1) a perspective of cognitive science towards formation of the concepts of the students, highlighting the interaction of psychological and affective aspects of cognitive development, in a socio-historical focus; (2) attention to the school/family/society relationship, discussing aspects related to reproduction and the socio-cultural transformation, focusing on: the influence of the social model; the economic situation; the family structure; the pedagogic alternative and the type of school; all related to health; (3) the proposition of new methodological strategies to be assessed, utilizing recreational resources, and founded in critical analyzes, considering school as pedagogic work as well as "a place for elaboration and investigation of the social formation of the mind", (Smolka 1991), where space should be guaranteed for expression and reflection, as an important aspect towards the valorization of life.

## HEALTH EDUCATION AND ITS ROLE IN THE CONTROL OF DISEASES

The importance of information/education for children and young people and the role of school and teachers in disease prevention is easily demonstrated by diverse examples of successful strategies that reflect the progressive drop in prevalence and incidence of certain health problems, verified through longitudinal analyzes.

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A very successful example is presented by Dias (1993), related to the control of Chagas disease. In our country, this is one of the endemic diseases for which control methods have been very successful, as a result of the experience originally developed by Dias, in Bambuí. In an interview with Schall (2001), Dias relates that through living in the locality, knowing the region and being involved in health education projects, he perceived that the most efficient route for the dissemination of information involved the rural school and above all, the rural teacher. At this time, he counted on the invaluable collaboration of Hortênsia de Hollanda, director of the National Division of Sanitary Education (DNES) of the Ministry of Health, who implanted and supported innumerable programs, in Brazil (Schall 1999). The researcher Angelina Garcia, from the Centro de Pesquisas René Rachou, also collaborated in the program (Dias & Garcia 1976). Dias began by stimulating and orienting the development of an educational program in 36 rural schools of the region, as well as by providing medical attention to the students, 2-4 times a year. According to this researcher, there was no difficulty in uniting the schools and proposing a model that still functions today. Courses were offered to the teachers, who were trained to inform the population, stimulating their collaboration to detect sporadic foci and notify the authorities, who were then able to treat cases of Chagas diseases. The control of Chagas disease is not the only item in this model, since the program sought to involve the community in the development of a more organized society that contributed to the general improvement of health, e.g. by forming cooperatives, founding a union, vaccination campaigns for children, health surveys and treatment of intestinal helminthiasis.

Today, more than 400 municipalities in Minas Gerais together with many others, in Brazil and even in other countries, use the model developed in Bambuí, which is mirrored in the current control of the disease.

In turn, recent data (National Coordination of Sexually Transmitted Diseases and Aids – Minister of Health, 1999) published on the occasion of the International Day of Action against Aids (1/12/99), mentioned the 50% drop in new cases of the disease in young people, while the incidence tripled among adult women. The report stressed the important role of information/education directed to young people, to whom campaigns and educational processes in the schools are now showing results. It was also pointed out that the costs of prevention are much lower than those of treatment, benefiting both only health and the economy of the country. In this light, the multiple efforts that integrate public and private institutions, NGOs and the media

should be emphasized. The role of teachers has been fundamental, particularly the wide national coverage of the courses and/or training of teachers together with the free distribution of educational material and condoms, a process in which we have participated actively, since 1988 (Rebello et al., 1989, Monteiro et al. 1991, 1993, Schall et al. 1999).

Focusing on schistosomiasis, the same success has not been registered, except in some cases studies, as below described.

#### **SCHISTOSOMIASIS – THE EXAMPLE OF MINAS GERAIS AND SPECIFICALLY OF THE METROPOLITAN REGION OF BELO HORIZONTE**

Schistosomiasis is an endemic disease in the State of Minas Gerais. In the metropolitan region of Belo Horizonte, our study area, autochthonous cases of schistosomiasis in children have been referred in the literature for 80 years (Teixeira 1920, Martins 1937, Senra & Felicíssimo 1942, Versiani et al. 1945, Pellon & Teixeira 1950). From 1956 onwards the entity then known as the National Department of Rural Endemic Diseases (Dneru) assumed the responsibility for the combat and study of schistosomiasis mansoni (among other parasitic diseases). Data collected by Dneru from 1957-1964, revealed a prevalence of 7.4% among 2,136 children in 52 neighborhoods. Cotta and Milward de Andrade (1967) presented similar results in 1938 (11.7% infected among 2,650 persons examined) and 1945 (12.5% among 2,352 schoolchildren examined). In turn, data by Pellon and Teixeira (1950) and Dneru (1957-64) are “practically identical to each other: 7.1% and 7.4% among 25,210 and 28,628 coproscopic examinations, respectively”. Later, Katz et al. (1978) encountered a prevalence of 12.1% among 14,373 coproscopic examinations carried out in the city. In this study, the authors called attention to the increasing prevalence of schistosomiasis in Minas Gerais, despite the socio-economic development observed in previous decades. In 1986, Araújo et al. surveyed 17 public schools in Belo Horizonte using the Kato-Katz method (Katz et al. 1972) and demonstrated a prevalence of 10% among 111,112 schoolchildren examined. Gomes dos Santos et al. (1990) studied 105 students from Santa Luzia and found 18.1% infected, while Schall et al. (1993) noted prevalences of 12.9% (1988) and 11% (1989) that reaffirm the percentages shown above. Recently, Passos and Amaral (1998) presented the prevalences estimated by state, from data collected by the National Health Foundation (Funasa), demonstrating an increase in prevalence in Minas Gerais, in 1997 and 1998, compared to 1996. The data presented in the analysis of Katz and Peixoto (2000) indicate prevalences of 8.97% for 1996 and 7.84% for 1997,

corresponding to almost a million and a half sick people with 15 million exposed to the risk of the disease in the state.

If we compare the data since 1938 with those of the present day, we can observe prevalences that vary from 7-10% for the metropolitan region of Belo Horizonte and between 7-8 % for Minas Gerais. These data reveal the inefficiency of control measures, which have been unable to modify the general profile of permanence of the disease for more than seven decades, although there has been a notable decrease in morbidity and mortality associated with more effective medication that is easier to take. These data lead us to reflect on the quality of actions performed to control the disease and above all, regarding our interest in the area of health education.

The scenario of control that is presented at the national level, based on governmental organizations, is a repetition of the same actions over recent decades. Coproscopic examinations are carried out and sick people are treated. In some areas, molluscicide is applied for the control of snails that transmit the fluke and when resources and political willing are available, sanitation and environmental improvement projects are carried out. Sanitary officials and health agents inform us that, "in the process of collecting samples and providing medication, we provide "health education", by informing the population about the disease and distributing pamphlets. And what is the material provided? Here we present an analysis of some examples of pamphlets, posters and leaflets distributed since the 1960s until the present day, which are, in fact, reproductions of one another, with slight changes that do not always represent improvements. Errors are copied and repeated for decades on end, without any critical evaluation or social responsibility whatsoever in those who reproduce and distribute them. Lots of paper, ink and graphical services have been wasted, considering that the adult population, showing the highest prevalence of the disease, is mostly composed of people without ac-

cess to alphabetization. As they are unable to read and interpret the pamphlets and other materials, which are based on an explanation of the cycle and in the measures they should adopt to avoid contact with schistosomiasis, the information becomes useless.

#### AN EXPLORATORY ANALYSIS OF INFORMATIVE AND EDUCATIVE MATERIALS ABOUT SCHISTOSOMIASIS

Some examples of informative and educative materials about schistosomiasis were analyzed in the exploratory study by Diniz and Schall (2000), which involved a sample (n = 35) of materials produced and/or used from the 1970s onwards in several regions of the country, based on quantitative and qualitative criteria. The sample was analyzed according to its classification, content and illustrations. The EpiInfo program was used to organize and analyze the data base. The publications were classified among eight categories, as shown in Fig. 1, characterized by leaflets, posters, cartoons, technical manuals and many others. The responsible health entities that published the materials, and target public are shown in the Table. It can be observed that the majority of the materials is produced by government institutions linked to the Minister of Health (71.4%). The materials directed to the public (77.1%) or to health professionals (20%). Data show that the majority of the materials prioritize forms of pedagogic activity that further resemble marketing and advertisement strategies commonly used in emergency public health campaigns, reproduced over the years as copies of each other (Figs 2, 3). These materials emphasize the transmission and prevention of schistosomiasis and other helminthiasis. Although such focus is insufficient for health education, it should stimulate participation of the population and incentive environmental improvements. With regard to the basic content of material on schistosomiasis, grave errors are found (Figs. 2, 3) e.g. drawings or photos of the garden snail (*Bradybaena similaris*) instead of the mollusc vectors (three species of *Biomphalaria*) and

TABLE  
Institutions that publish the informative/educative materials and public destined

Institutions	Health professionals (%)	Teachers (%)	General population (%)	Total (%)
Minister of Health Institutions	6	1	18	25(71.4)
Other Government Institutions	0	0	3	3(8.6)
Universities	0	0	2	2(5.7)
Privaty biochemical companies	1	0	1	2(5.7)
Newspapers	0	0	1	1(2.9)
Not informed	0	0	2	2(5.7)
Total (%)	7(20)	1(2.9)	27(77.1)	35(100)

errors concerning oviposition by flukes in the human body, among other mistakes. Materials with more progressive foci should include contextualized information, permitting reflection and decision-making, requiring access to public health services and environmental improvements, thus contributing to the prevention of diseases and the promotion of health.

Complementing these analyzes of educative/informative materials, we are developing studies about the knowledge of the population from endemic areas. The lack of information as well as unused information can be seen from the results of several studies, including our own work in the

metropolitan region of Belo Horizonte. These prove that people at risk, being from the metropolitan region or immigrants from high prevalence areas, supposedly controlled by governmental diseases programs, know practically nothing about schistosomiasis cycle and transmission. They are also unaware about the contact risks with bodies of water where the vector snail occurs. One of these studies is briefly presented below.

**A CASE STUDY IN BELO HORIZONTE**

This exploratory study was performed in Belo Horizonte as part of a project with the objective of studying clinical, epidemiological and socioeco-

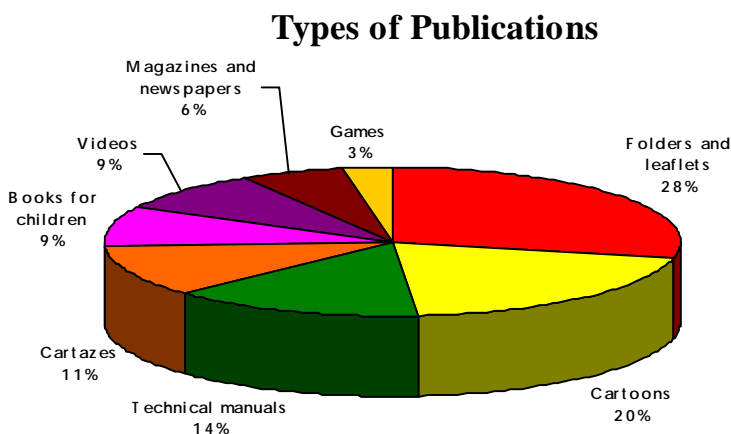


Fig. 1: classification of the informative/educative materials about schistosomiasis analyzed (n = 35).

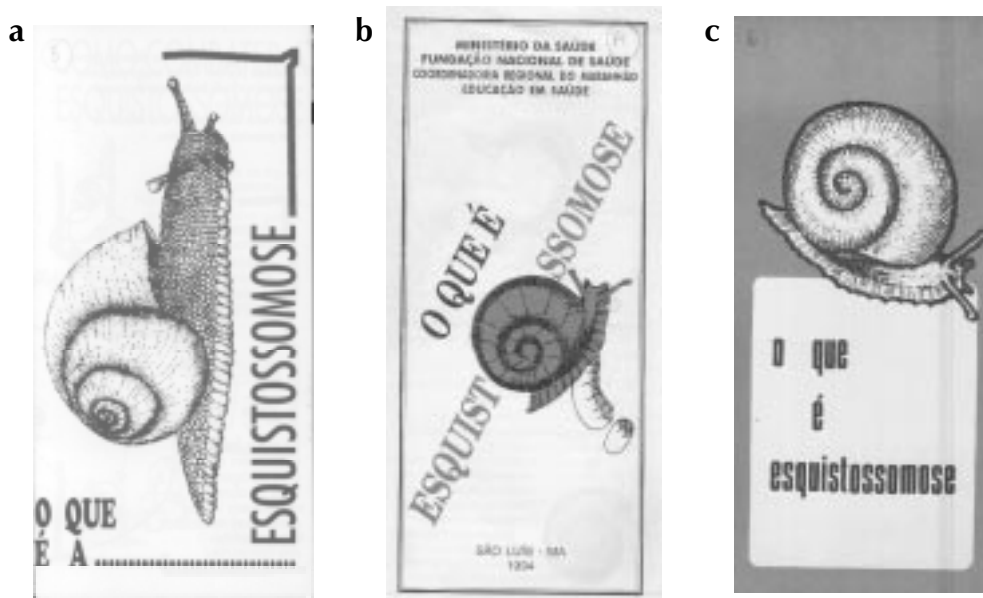


Fig. 2: folder distributed in 1999 (a) exhibiting a snail vector that belongs to a wrong species, exemplifying error regarding factors linked to transmission. The contents and presentations are reproductions from other materials distributed in the past (b: 1994; c: in the 80's).



Fig. 3: poster in which health education and community participation is not even mentioned and also exhibiting a snail vector that belongs to a wrong species, reinforcing error regarding factors linked to transmission (Developed and distributed by the health services (SUS) from the State of Pernambuco - Brazil, in 1998)

nomical aspects of schistosomiasis mansoni in an urban area, evaluating the repercussions of a three-year health education project in two local schools. The study area (Gorduras) is a shanty town with a population of 10,000 people, with approximately 2,000 schistosomiasis infected. Although some dwellings have basic sanitation, others are situated adjacent to ponds and channels where the snail that transmits the disease is frequently found.

A morbidity interview was conducted with 30 women (mothers). The aim of these interviews was to evaluate the perception and importance of schistosomiasis by this population and to know their opinions about their health conditions and services. Another interview (specifically on schistosomiasis) was carried out with 22 women from the same sample interviewed about morbidity and more 30 adult men over 25 years old.

In these interviews some topics were investigated: (a) knowledge about schistosomiasis disease; (b) recognition of the snail when it was presented to them in a transparent box; (c) knowledge on transmission, treatment, diagnosis and symptoms; (d) occurrence of cases in the family and their seriousness; (e) their opinion about the disease as

a problem in the community and (f) ways of disease control. The interviews were performed by two psychologists using only a question guide. This procedure was adopted in order to guarantee a comfortable relationship with the interviewee and reliability of the data.

### Morbidity interviews

The interviewed sample (30 women) ranged in age from 23 to 77 years old, with the majority of people between 30-49 years old. The number of persons per dwelling varied from 1-9, with an average of 5 persons. Regarding recent health problems, influenza was pointed out by 50% of the women. Others reported symptoms such as abdominal pain, headache and high blood pressure. The children were the most commonly mentioned as suffering health problems such as measles, bronchitis, diarrhea etc. Among the previous health problems bronchitis, high pressure, diabetes, ulcers, Chagas disease, cardiac and nervous problems were also figured. Schistosomiasis was never referred to as a previous or current health problem. With respect to medical attention and treatment, all correspondents used the public hospital or local

health center. Only three (10%) reported that they did not like the way they were treated. Some women (11-36.6%) mentioned self-medication indicating some kinds of medical herbs and teas made of leaves, roots and fruits. They also reported the use of “simpatias” (ritual acts performed to cure disease), some of which were potentially dangerous to health. Ignorance of prescribed medicines was also observed, many drugs being incorrectly used, e.g. the antibiotic Bactrin taken as an anemia medicine. In this first qualitative analyzes, it was observed that the problems involved prolonged suffering with painful symptoms. People sought a physician only in extreme situations and medicines were not correctly distinguished. Self-medication was frequent, mainly involving the use of medical herbs, sometimes associated with aspirin. The lack of information is a serious problem not only related to the medical assistance rights but also to the correct action of medical herbs and medicines.

#### **SOCIAL REPRESENTATION AND PERCEPTION ON SCHISTOSOMIASIS**

##### **Adult women**

This group was interviewed with regard to morbidity and schistosomiasis. When asked if they had heard about schistosomiasis, all 22 individuals (100%) mentioned yes and nine (40%) identified themselves or someone in the family as having had the disease. One woman (4.5%) affirmed that all her family had had the disease and another mentioned esplenectomy in a nephew. Six (27.3%) identified schistosomiasis as being due to a worm but only one (4.5%) described the correct mode of transmission, mentioning both contaminated feces and the snail as a vector. Some disease symptoms were indicated, including skin problems, headache, dizziness, hunger, fainting, pain in the legs, darkening of visual field and nausea. Other ideas presented included “it is a disease that kills” (3-16%), “it is dangerous” (6-27.3%), “this eats the spleen”, or “it eats the liver”. One woman said that the worm was eating the liver of her husband. Another affirmed the worm “spawns” in the head, “attacking” the brain. Most women stated that they had the disease associated with the rural locality, in which they lived. All (100%) had been born in rural areas or small towns, then moved to the state capital (Belo Horizonte). The origin of the sample and its superposition with the endemic areas of the state can be understood using a map of Minas Gerais. A preliminary profile indicates that the majority came from small towns in the north of the state, in the vicinities of Governador Valadares and Teófilo Otoni and other cities in *Schistosoma*-endemic regions. Focusing on the transmission, 16 persons (72.7%) mentioned transmission by stagnant and unfiltered,

dirty water. Six of these people (27.3%) pointed out the importance of contact by bathing and seven (31.8%) of drinking unfiltered water. Only one (4.5%) did not know how transmission occurred. Other suggestions included poor hygiene (not washing) (3-13.6%), contact with snails (2-9.1%), microbes (3-13.6%), absence of a sewer system (1-4.5. %) and working in rice plantations (2-9.1%). Some of the respondents gave more than one suggestion about transmission. The same woman, who mentioned schistosomiasis as being prevalent in her entire family, identified the Borges lagoon in Gorduras as a transmission site.

When asked about the aethiological agent of the disease, 12 (54.5%) did not know, 3 (13.6%) gave the snail vector, 4 (18.2%) answered “microbes”, 1 (4.5%) mentioned mosquitoes, 4 (18.2%) worms, and 2 (9.1%) indicated the absence of hygiene or filtration of the water. As regards diagnosis, 15 (68.2%) were aware of fecal examinations, 5 (22.7%) mentioned the symptoms and 2 (9.1%) did not know.

The symptoms reported were: nervous alterations (3-13.6%), headache (7-31.8%), dizziness (10-45.5%), fainting (1-4.5%), swollen belly (4-18.2%), anemia (2-9.1%), skin spots (1-4.5%), darkened field of vision (3-13.6%), pain in the legs (3-13.6%) and lack of appetite (1-4.5%). Three (13.6%) could not describe any symptoms. The answers to these questions reinforced those to the first question (have you heard about schistosomiasis?), demonstrating that a common body of knowledge exists regarding the disease, conferring reliability to the results.

##### **Adult men**

The answers of one of the 30 men interviewed were discounted because his wife helped him to provide some of the information. Of the remaining 29 persons, eight (27.6%) were born and still resided in Belo Horizonte. Two of them (6.9%) revealed that they had schistosomiasis.

The men interviewed were between 20 and 69 years old, the majority of them being aged 30-49. Only 2 (6.9%) had never heard about the disease and 3 (10.3%) did not know how to explain it. The majority of the men gave several answers such as: being a worm (7-24.1%), or “a snail” (1-3.4%), presenting enumerated symptoms (17-58.6%), the disease was linked to dirt or stagnant water (9-31%), schistosomiasis attacked the liver and spleen (9-31%), that it “went to the brain” (2-6.9%), being able to kill (9-31%). Three men (10.3%) cited family members or friends who had died as a consequence of the disease. The idea of the worm eating the liver or spleen was recurrent. From the volume of the answers, it was observed that men presented more different information than did women. In addition, they described alternative treatments, such as kero-

sene mixed with coffee and drunk at breakfast for three days using a soup spoon; cane spirit (*cachaça*) with eucalyptus; milk with creolin; or slugs ingested with alcohol. Beliefs related to the disease included: eating tomatoes before fecal examinations or submitting material to examination after rain in order to increase the positivity.

It is important to point out that out of the 29 men interviewed, 22 (75.9%) mentioned the occurrence of schistosomiasis in the family, including some of them. Only two (6.9%) associated the presence of the snail with the disease, and one of them reported that his daughter, a student of the control school of our educational study in an area of high prevalence, had explained to his family that the snail carried a worm named "miquistossomose". When the snail was shown to them, 24 (82.8%) identified it as "as living in the water rather than under stones in gardens", but did not believe that it could transmit any disease. Some of them commented that in their childhood, they used to play with these animals and drank the water where they were found. Two (6.9%) associated snails with filthiness and affirmed that "where there is filthiness there are worms". Another one mentioned that the snail could cause a burning rash on the legs, and that this had happened to his brothers. Only two (6.9%) associated snails with the disease (the same two who associated snails with filthiness).

#### DISCUSSION AND CONSIDERATIONS ON THE ACTIONS AND EDUCATIONAL MATERIALS

It can be verified that both women and men interviewed, despite knowing the disease or having it, they demonstrated a lack of knowledge about it, presenting some believes and misuse of medicines. Although it is necessary improve and amplify the health education programs, it is urgent to think in the more appropriate ways and strategies to do that. Education cannot be limited to the principal target public, i.e., the population under risk of falling ill, but should include all the social players involved in the network of transmission, as pointed out in previous articles (Schall 1987, 1989, 1994, 1995, 1996, 1998). One needs to intensify dialog with local authorities, health technicians and the population in general. We have examples from areas where the city councils do not prioritize or provide economic resources for health projects. Such councilors or authorities in the guise of environmentalists impede the use of molluscicides such as niclosamide, used in *Schistosoma*-endemic regions throughout the world. In the name of environmental protection, they allow the populations to remain exposed to the infection, so that prevalences over 60% may be registered in some localities. As an example, we may cite Jaboticatubas, Minas Gerais,

where the town council has not permitted the use of molluscicide since 1986 and the prevalence of schistosomiasis remains high in localities that lack sanitation (Cury et al. 1994, Souza et al. 1998).

In the examples discussed above, one can remark how derivative and ineffective are the manuals prepared by local health technicians. There is almost no difference and very little improvement between the Sucam (today Funasa - National Foundation of Health) manual, of 1988, and that prepared 10 years later by the Funasa. In three of these manuals, health education is quoted in only one line, without any suggestions regarding control strategies, suitable examples or reflections on what should be done. Only in the manual from Minas Gerais can this type of initiative be seen, focusing on meetings with the community. This inclusion is laudable, but we could go much further. Successful examples of experiments carried out and evaluated by researchers are scarce but well-founded, having shown their efficacy and applicability. During the symposium we had the opportunity to hear about some of these experiences, which unfortunately were circumscribed to the areas studied, and are a long way from being applied to wider areas. Their results should be made to echo over the four corners of the country. Although these experiments may not be innovative when proposed, they improve progressively. We can attest to the efficacy of the pioneering work of Hollanda (1958) and Garcia (1966), as well as the "Project for the Environmental Control of Schistosomiasis" (1970), carried out in Calciolândia, Arcos, Minas Gerais, by a multidisciplinary team of researchers from the Centro de Pesquisas René Rachou (Fundação Oswaldo Cruz) and Sucam (Superintendência de Campanhas - Ministry of Health). We may cite other more recent examples, with promising results, both with respect to the knowledge acquired as well as the control of prevalence, all counting on the participation of the local population, developed in different localities, in the states of Bahia, Minas Gerais and Pernambuco, (Schall et al. 1993, Barbosa 1996, Rozemberg 1994, 1996, Coura-Filho et al. 1996, Coura-Filho 1998, Grynszpan et al. 1999, among others). Based in our studies, it is important to include here some suggestions that can help people that are involved with control programs to improve their actions.

#### RECOMMENDATIONS RESULTING FROM THE STUDIES CARRIED OUT WITH SCHOOLS

In synthesis, through systematic evaluations of the strategies and materials developed, certain points were observed as being important for the effectiveness of the materials and educational processes, such as: (1) the elaboration of educational

materials on health requires as a starting point the investigation of knowledge, attitudes, behaviors and beliefs of the population, to better establish the references of language and previous knowledge; (2) during the planning and development of strategies and materials, the population should be involved from the first steps and systematic evaluations should include their participation; (3) use language appropriate to the juvenile public and attractive drawings (in color, if financially viable), that favor motivation and knowledge construction during this phase; (4) avoid technical terminology (an appendix may be provided for the students who desire more detailed information); (5) avoid stylized representations of parasites that may lead to incorrect and pedagogically inadequate interpretations. Make drawings, include photographs or schematic images of the parasites, providing the exact measurements or scales, so that the students know how they really are. Ideally, a mini-laboratory should be set up in the school, containing slides and flasks with fixed parasites for observation. This is highly motivational and educational for children and their families; (6) seek to stimulate children and young people by diverse methods, so that the information can be accessed by several senses (vision, hearing, touch), using literary texts, music, drawings, dramatization, modeling etc. (7) use television clips featuring personalities with whom children identify, in scenes of daily life that depict prevention measures and that can be discussed in the classroom; (8) consider health education as a continuous process, included in the school curriculum; other topics relevant to the school community should be treated year by year, with growing levels of information and integration of new material to the original contents; (9) consider that the child will benefit more from concrete experiences and from pedagogic media and strategies that integrate cognitive and affective aspects.

Consider that the success of any strategy and educational material depends on the ability of teachers and health agents to develop and evaluate the effectiveness of projects and programs, taking into account regional differences and specific contexts of the areas where they work. In order to deepen the focused contents of the educational material, it becomes necessary to offer suggestions for activities and considerations that stimulate teachers to: (1) regard the students' reality (socioeconomic and cultural aspects) and the knowledge previously built, as prerequisites for new contents to be worked on; (2) learn how to listen to their students and to have a dialog with them, offering opportunities for exchange of experiences among classmates and opening a space to express their creativity; (3) foster parent's participation and community in-

volvement; (4) turn the classroom, the school and nature into a laboratory for observing and collecting data, from which learning situations and projects may be developed; (5) favor the development of student activities such as: observation, analysis, measurement, communication, classification, proposal and predictions, all in the sense of introducing a basis for the understanding and acquisition of appropriate processes related to the scientific method, which will lead children to create, discover, transform, criticize and overcome false beliefs.

These are some of the aspects that, in our experience, have been shown to be effective for the educational process that has as its goals the promotion of health and of self-esteem in each child, since the development of a good self-image is a fundamental starting point in the care and valorization of one's own health, promoting interest in information and the construction of new specific knowledge, increasing the attention for that which could improve the quality of life.

#### REFERENCES

- Araújo MC, Carvalho JR, Figueira EB, Guedes MS, Polinelli LMV, Del'Rio BR, Mello GC, Marques RN 1986. Levantamento parasitológico da esquistossomose mansoni em escolares da rede municipal de Belo Horizonte. *Rev Soc Bras Med Trop*: 19: 63-64.
- Barbosa CCGS 1996. *Esquistossomose em Pernambuco: Determinantes Bio-ecológicos e Sócio Culturais em Comunidade de Pequenos Agricultores da Zona da Mata*, PhD Thesis, Fiocruz, Rio de Janeiro.
- Coura-Filho P 1998. An alternative model for schistosomiasis control with active participation by the population through the unified Health System (SUS) in Taquaraçu de Minas (Minas Gerais, Brazil) from 1985 to 1995. *Cad. Saúde Públ.* 14 (Supl. 2): 111-122.
- Coura-Filho P, Rocha RS, Lamartine SS, Farah MWC, Rezende DF, Costa JO, Katz N 1996. Control of schistosomiasis mansoni in Ravena (Sabará, State of Minas Gerais, Brazil) through water supply and quadrennial treatments. *Mem Inst Oswaldo Cruz* 91: 659-64.
- Cury GC, Salles PGO, Reis MCW, Rego VM, Arndt AW, Souza Filho CBA, Moreira HB, Abreu MS, Leite PMG 1994. Prevalência da esquistossomose mansoni e de parasitoses intestinais em escolares da área rural do município de Jaboticatubas, MG, 1992-1993. *Rev Soc Bras Med Trop* 27: 217-220.
- Dias JCP 1993. Vigilância epidemiológica contra o *Tritatoma infestans*. *Rev Soc Bras Med Trop* 26 (Supl. III): 39-44.
- Dias JCP, Garcia ALR 1976. Vigilância epidemiológica com participação comunitária. *Rev Inst Educ Saud* 19: 29-44.
- Diniz MCP, Schall VT 2000. Estudo exploratório sobre estratégias e materiais educativos utilizados na



- prevenção e controle da esquistossomose e outras helmintoses, 52ª Reunião Anual da SBPC, Brasília.
- Garcia ALR. 1966. Educação sanitária e esquistossomose. *Rev Bras Malar Doença Trop* 17: 175-188.
- Gomes dos Santos M, Massara CL, Morais GS 1990. Investigação do conhecimento das helmintoses intestinais em crianças pertencentes a uma escola da periferia de Santa Luzia, MG. *Ci Cul* 42: 188-194.
- Grynspan D, Rocha RS, Coimbra AMC 1999. Multidisciplinary approach in a schistosomiasis control program – the experience of Comercinho. VII International Symposium on Schistosomiasis, Rio de Janeiro, RJ.
- Hollanda, H. 1958. A contribuição da educação sanitária no controle da esquistossomose e outras parasitoses e o seu papel no desenvolvimento das comunidades. *Proceedings of the Sixth International Congress on Tropical Medicine and Malaria* 6: 546-547.
- Katz N, Peixoto SV 2000. Análise crítica da estimativa do número de portadores de esquistossomose mansoni no Brasil. *Rev Soc Bras Med Trop* 33: 303-308.
- Katz N, Chaves A, Pellegrino J 1972. A simple device for quantitative stool thick-smear technique schistosomiasis mansoni. *Rev Inst Med Trop São Paulo* 14: 397-400.
- Katz N, Zicker F, Rocha RS, Oliveira VB 1978. Re-infection of patients in schistosomiasis mansoni endemic areas after specific treatment. I. Influence of age and worm burden. *Rev Inst Med Trop São Paulo* 20: 273-278.
- Martins AV 1937. Sobre a pesquisa dos ovos de *Schistosoma mansoni* pelo método de sedimentação-concentração. *Brasil Médico* 51: 319-321.
- Monteiro SS, Rebello SM, Schall VT 1991. An educational game about AIDS for children. *Inter J Health Educ* X: 32-35.
- Monteiro SS, Almeida AC, Schall VT, Rodrigues AB, Silva A 1993. Investigation knowledge and attitudes of elementary students. IX<sup>th</sup> International Conference on AIDS Education, Berlin, Germany.
- Passos ADC, Amaral RS 1998. Esquistossomose mansônica: aspectos epidemiológicos e de controle. *Rev Soc Bras Med Trop* 31: 61-74.
- Pellon AB, Teixeira I 1950 - *Distribuição Geográfica da Esquistossomose Mansônica no Brasil*, Divisão de Organização Sanitária, Rio de Janeiro.
- Rebello SM, Monteiro SS, Schall VT, Moreira M, Pinto-Dias A, Santos MG 1989. Conhecimento da AIDS entre crianças e pré-adolescentes. Um estudo amostral do Rio de Janeiro e Belo Horizonte, 41ª Reunião Anual da SBPC, Fortaleza.
- Rozemberg, B. 1994. Representações sociais de eventos somáticos ligados à esquistossomose. *Cad Saúde Públ* 10: 30-46.
- Rozemberg B 1995. *A Intransparência da Comunicação: Crítica Teórica Metodológica sobre a Interação do Saber e das Práticas Médicas e a Experiência das Populações de Área Endêmica de Esquistossomose*, PhD Thesis, Escola Nacional de Saúde Pública, Rio de Janeiro.
- Schall VT 1987. Health education for children in the control of schistosomiasis. *Mem Inst Oswaldo Cruz* 82 (Suppl. IV): 285-295.
- Schall VT 1989. Educação em saúde e esquistossomose: breve retrospectiva e uma proposta. *Mem Inst Oswaldo Cruz* 84 (Suppl. 1): 84-90.
- Schall VT 1994. Environmental and health education for school-age children a transdisciplinary approach. *Cad Saúde Públ* 10: 259-263.
- Schall VT 1995. Health education, public information and communication in schistosomiasis control in Brazil: a brief retrospective and perspective. *Mem Inst Oswaldo Cruz* 90: 229-234.
- Schall VT 1998. An interactive perspective of health education for the tropical disease control: the schistosomiasis case. *Mem Inst Oswaldo Cruz* 93(Suppl. 1): 51-58.
- Schall VT 1999. Alfabetizando o corpo: o pioneirismo de Hortênsia de Hollanda na Educação em Saúde. *Cad Saúde Públ* 15 (Suppl. 2): 149-159.
- Schall VT 2001. *Contos de Fatos: Histórias de Manguinhos*, Fiocruz, Rio de Janeiro, p. 197-217.
- Schall VT, Dias AGP, Malaquias MLG, Gomes dos Santos M 1993. Educação em saúde em escolas públicas de primeiro grau da periferia de Belo Horizonte, MG (Brasil). Avaliação de um programa relativo a esquistossomose. *Rev Inst Med Trop São Paulo* 35: 563-572.
- Schall VT, Monteiro SS, Rebello SM, Torres M 1999. Evaluation of the Zig-Zaids game: an entertaining educational tool for HIV/AIDS prevention. *Cad Saúde Públ* 15 (Suppl. 2): 107-119.
- Senra J, Felicíssimo, O. 1942. Contribuição ao estudo das parasitoses humanas em Belo Horizonte. *Brasil Médico* 56: 547-549.
- Smolka ALB 1991. A prática discursiva em sala de aula: uma perspectiva teórica e um esboço de análise. *Cad Cedes* 24: 51-65.
- Souza CP, Drumond SC, Silva JCE, Queiroz LA, Guimarães CT, Rocha RS 1998. Investigação sobre a transmissão da esquistossomose no complexo turístico da Serra do Cipó, MG. *IESUS VII*: 43-51.
- Teixeira JM 1920. *A Schistosomose Mansônica na Infância em Belo Horizonte*, Thesis, Universidade Federal de Minas Gerais, Belo Horizonte.
- Valla VV, Melo JAC 1986. Sem educação ou sem dinheiro? In *A Saúde em Estado de Choque*, Espaço e Tempo e Fase, Rio de Janeiro, p. 21-35.
- Versiani W, Martins AV, Pena Sobrinho O 1945. Esquistossomose mansônica no Estado de Minas Gerais. *Arq Inst Químico-Biológico do Estado de Minas Gerais* 1: 71-94.

