

# Schistosomiasis Control in Brazil

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*In 1975 the Special Programme for Schistosomiasis Control was introduced in Brazil with the objective of controlling this parasitic disease in six northeastern states. The methodology applied varied largely from state to state, but was based mainly on chemotherapy. This Programme was modified about ten years after it beginning with the main goals including control of morbidity and the blockage of establishment of new foci in non-endemic areas. In two states, Bahia and Minas Gerais, the schistosomiasis control programme started in 1979 and 1983, respectively. The recently made evaluation of those two programmes is the main focus of this paper. It must also be pointed out, that the great majority of the studies performed by different researchers in Brazil, at different endemic areas, consistently found significant decrease on prevalence and incidence, when control measures are repeatedly used for several years. Significant decrease of hepatosplenic forms in the studied areas is well documented in Brazil. After more than 20 years of schistosomiasis control programmes in our country, chemotherapy has shown to be a very important tool for the control of morbidity and to decrease prevalence and incidence in endemic areas. Nevertheless, in medium and long terms, sanitation, water supply, sewage draining and health education seem to be the real tools when the aim is persistent and definitive schistosomiasis control.*

Key words: schistosomiasis - control - Brazil

In 1975 the Special Programme for Schistosomiasis Control (PECE) in Brazil was introduced, aiming to control this endemy in six northeastern states (Almeida Machado 1982). Although the methodology varied largely from state to state, PECE was based mainly on chemotherapy and molluscicide application with the objective of controlling schistosomiasis transmission. This Programme was modified about ten years later and the main goals since 1995 are reduction of the prevalence at locality level to less than 25%; reduction of the incidence and prevalence of hepatosplenic cases and death caused by schistosomiasis infection; transmission control at isolate foci and prevention of the spread of schistosomiasis to new areas. In two states, Bahia and Minas Gerais, the schistosomiasis control programme started in 1979 and 1983, respectively. In the State of Minas Gerais, schistosomiasis is prevalent in 519 out of the 853 municipalities, with an estimated number of 1.000,000 infected people; in an area of 300,000 km<sup>2</sup> (IBGE 1991, Drumond 1994). The southern region of the state (with the exception of Itajubá) and the Triângulo Mineiro, north-

west of Minas Gerais (with the exception of Araxá) are non-endemic regions (Katz et al. 1978, Katz & Carvalho 1983). A rough estimation is that 10 million out of 16 million inhabitants are under risk of getting infected. Lima e Costa et al. (1996) evaluated the programme developed by SUCAM (Superintendência de Campanhas) Ministry of Health, named after 1991, National Health Foundation - FNS at the São Francisco river basin, situated in the north of Minas Gerais. This region has six municipalities, with an area of more than 10,000 km<sup>2</sup> and with about 130,000 inhabitants. The activities started between 1983-1985 in four municipalities and in 1987 in two other. The main measures of control were repeated treatment and the use of molluscicide. For clinical treatment oxamniquine was used in a single oral dose of 15 mg/kg for adults and 20 mg/kg for children. As molluscicide, niclosamide was used. In two municipalities the prevalence was of approximately 30%, in two of approximately 18% and the last two had prevalences below 5%. After the first chemotherapy intervention prevalence dropped sharply (two to three times) and remained below the initial levels at least until the last evaluation ten years later. The presence of infected snails, which was very high in the beginning of the programme (from 38.8 to 79.1% in four municipalities), decreased sharply (about ten times) after molluscicide application and clinical treatment. In

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the other two municipalities where only 1 to 2% of the snails were infected, no decrease was observed after intervention with molluscicides. These authors showed that the proportion of localities without infection or with prevalence below 5% increased in relation to those with higher prevalence in the municipalities (with medium or high prevalence at the beginning). In the other two municipalities, with an initial prevalence below 5%, no significant changes were observed. In these areas the cost benefit of the control measures need to be better assessed. The same authors pointed out the difficulties of a long term control programme based only on repeated treatments (Lima e Costa et al. 1996).

The data collected in the State of Bahia were analyzed by Carmo and Barreto (1994). The prevalence of infection in 1950 and 1990 at the county level was compared. The conclusion of these authors is that no substantial changes were observed in the basic pattern of spatial distribution of the prevalence of schistosomiasis. Nevertheless, the prevalence decreased from 15.6% to 9.5%, in those 40 years, but new transmission areas were also found in this study. In about 70% of the counties there was a decrease (from 25 to 100%) on the prevalence. An unusual result was observed when the use of chemotherapy was evaluated. In the Paraguaçu river basin, chemotherapy is being applied since 1979, in all municipalities. Comparing to other river basins where no treatment (in large scale) was performed the mean reduction in prevalence was of 56% for the Paraguaçu basin and 36.7% in the no controlled areas. When the data obtained after seven or eight cycles of chemotherapy applied in the municipalities were compared to those where treatment was given only once, the reduction was similar in both groups (around 80%). In this study sewage and water supply effect on transmission was also evaluated. An unexpected result was obtained in this study where the presence of sewage system similarly to chemotherapy, was not associated with prevalence of the disease. Significant correlations of prevalence with domestic water supply (although weak) were found; prevalence correlates also with migrants and urban areas. The final conclusion from this paper refers to the correlation between urbanization and transmission. As the authors pointed out the incomplete form and the spatial inequalities that characterized the urbanization process created favorable conditions for the spread and the establishment of new foci of schistosomiasis mansoni (Carmo & Barreto 1994).

It must be also pointed out that the great majority of the studies performed in specific endemic areas, by different researchers in Brazil, consis-

tently find significant decrease on prevalence and on incidence of schistosomiasis, when control measures (chemotherapy and/or molluscicide) are repeatedly used for a number of years (Katz 1980, Coura et al. 1987, Coura Filho et al. 1992, Katz 1992, Lima e Costa et al. 1993).

The significant decrease of hepatosplenic forms in most of the studied area is well documented in Brazil. Sette, in 1953, followed the inhabitants of Catende, Pernambuco, where Jansen during the period from 1943 to 1947 had treated over 3,500 individuals with antimonials, applied molluscicide and promoted sanitation in the community. Two groups were studied: the first one consisted of 796 treated patients and the second one 100 untreated patients. The presence of splenomegaly after treatment was 1.7 and 9%, respectively. Studies on liver biopsies in deceased individuals from these groups during the years of 1937 to 1941 and 1942 to 1951 showed that the percentage of "cirrhosis" were 32.6 and 11.1% respectively, giving the first evidence that after specific treatment a sharp decrease on the number of hepatosplenic cases can be observed (Sette 1953). The next study was performed by Kloetzel (1962, 1967) in a well controlled trial made in Gameleira, Pernambuco, when it was recommended to treat the children between 7 and 10 years, with more than 500 eggs per gram of *Schistosoma mansoni*, even if reinfection is to be expected. In 1969, Bina evaluated clinically and treated with hycanthon 230 children (5 to 17 years old) with schistosomiasis mansoni in Caatinga do Moura, in the State of Bahia. Half of those children received treatment, and the other half were left as untreated controls. After two and six years, the patients were re-examined. Almost all treated patients were found to be re-infected after two years of follow-up, but the number of eggs per gram was lower than the control group. The more interesting observation was that in the treated group none of the children developed hepatosplenic form, but in the control group, 35 patients had developed this clinical form of the disease (Bina 1977). This study was confirmed in different areas in Brazil, and was taken as a definitive study for the recommendation for the use of chemotherapy to prevent-development of hepatosplenic form of the disease in endemic areas.

In 1984, a meeting of the World Health Organization Expert Committee, which included three Brazilian scientists, evaluated the efficacy of treatment in preventing the development of hepatosplenic schistosomiasis. The meeting was chaired by Dr Kenneth Mott, Head of Schistosomiasis and other Helminthic Infections of the Parasitic Diseases Program of the WHO. Dr Mott himself studied and worked for many years in Bahia in control

of morbidity, based on the use of chemotherapeutic agents. After this meeting treatment as the main measure for control of morbidity was officially recommended by WHO (1985). Other publications appeared in Brazil confirming that hepatosplenic cases are now less frequent in necropsies (Andrade & Bina 1985, Correia et al. 1997) and at surgery (Menezes Netto 1987). In addition, the National Health Foundation data showed that from 1977 to 1993 the mortality rate due to schistosomiasis fell from 0.65 to 0.30/100,000 inhabitants, a decrease of more than 50%. Hospital admissions due to schistosomiasis were 3/10,000 in 1989 and 1.5/10,000 in 1995.

It is very clear that after more than 20 years of schistosomiasis control programmes in our country, that chemotherapy was and is a very important tool for the control of morbidity and on the decrease of prevalence and incidence in endemic areas. Nevertheless, at medium and long terms, sanitation, water supply, sewage draining and health education seem to be the real tools if the aim is persistent and definitive control of schistosomiasis.

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