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# Progress in the control of Schistosomiasis in Zimbabwe since 1984

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SUMMARY

Schistosomiasis remains the second most important parasitic disease in Zimbabwe. In terms of its combined morbidity and prevalence, schistosomiasis is thought to be the most important helminth infection of man.

Since 1984, a number of control programmes have commenced around the country and a national control programme aimed at reducing morbidity is being implemented. The strategy adopted in Zimbabwe is a community based approach integrated in the primary health care system.

## INTRODUCTION

Surveys carried out at health facilities in Zimbabwe, show that schistosomiasis is one of the top ten causes of attendance at health facilities, especially in children, (Secretary for Health 1991). As the disease is a chronic insidious problem which causes morbidity, its effects have not been fully recognised. The infection is associated with poor nutrition and work performance in children,[13] and pathological changes in the liver, bladder and kidneys.[14]

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Blair Research Institute (BLR), the research department of the Ministry of Health, has much experience in the epidemiology and control of schistosomiasis. With the information available, it should be easier to define priority areas for schistosomiasis control.

For example, transmission of the disease is known to be seasonal and focal in space and time.[4,16] There is a lot of variation in the distribution of infection and in individual predisposition to infection.[3] Prevalence and intensity of infection peaks in children and young adults. In addition there is a positive correlation between infection status in a population sub-group and the relative transmission potential of water contact sites used[2] and also a pronounced specificity and marked conservatism in the human water contact pattern.[4]

The main aim of the present paper is to review the various control projects that have been set up in Zimbabwe since 1984. Initially the results of the nationwide survey which was reported by Taylor and Makura[18] are discussed. The survey concentrated on *Schistosoma haemotobium* and *Schistosoma mansoni* which are the two schistosome species affecting man in Zimbabwe. Since 1939, a number of surveys and control projects were conducted by BRI. The results and recommendations of these projects can now be implemented in the national schistosomiasis control programme.

## MATERIALS AND METHODS

**The distribution of schistosomiasis in Zimbabwe:** Fourteen thousand six hundred and fourteen school children, from 157 schools around Zimbabwe, were examined for schistosomiasis infection.[18] From the results obtained, the country was divided into three sections (A-C) according to the prevalence of urinary schistomiasis (Figure I) and two sections (D-E) (Figure II) for the intestinal form of the disease.

*Figure I: Percentage of 8–10 year old children with* ***S. haematobium*** *at each school sampled. the prevalence figure is shown overlying the geographic location of each school.*[18]

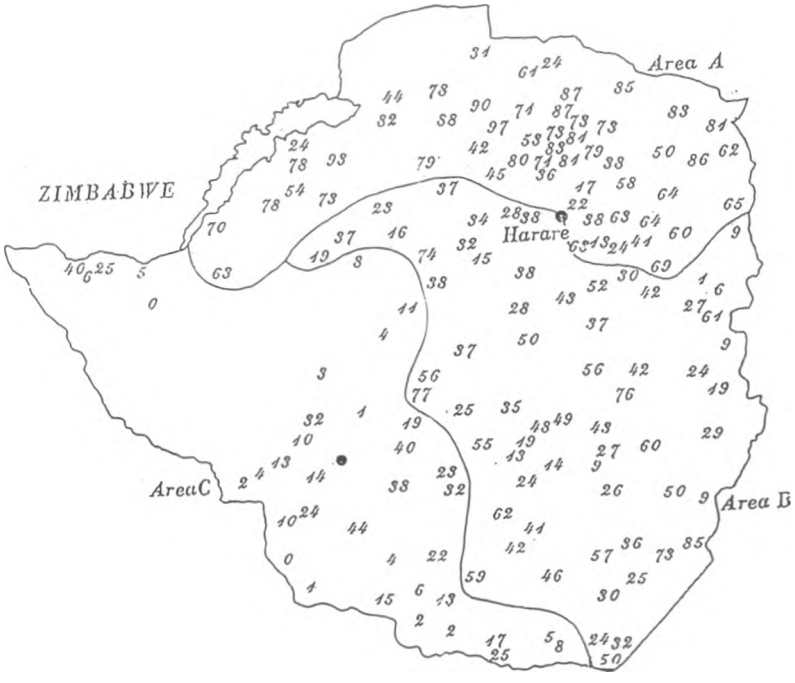
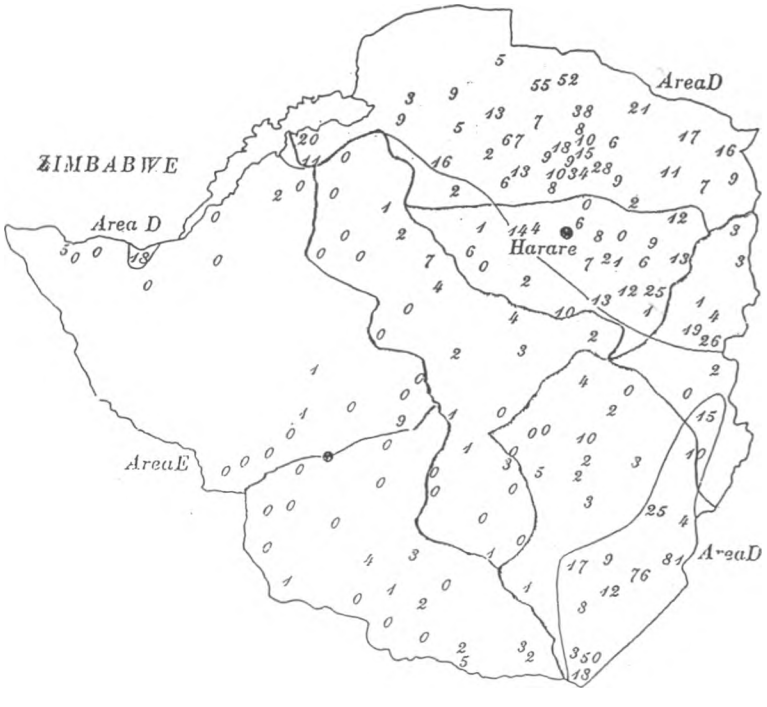



*Figure II: Percentage of 8–10 year old children with* ***S. mansoni*** *at each school sampled. The prevalence figure is shown overlying the geographic location of each school.*[18]



Sections were as follows; Section A: High prevalence zone: *S. haematobium* prevalence ranged from 13-97 pc with a mean value of 63,2 pc. This zone, which comprised the north-eastern area including Lake Kariba and Zambezi Valley. had high rainfalls and high temperatures which are ideal for high transmission of schistosomiasis.

Section B: Medium prevalence zone: The prevalence of *S.haemotobium* ranged from a low rate of one pc to a high rate of 85 pc with a mean of 37,1 pc. This area comprised the south-eastern and central parts of the country which receive moderate rainfall.

Section C: Low prevalence zone: The rate of infection in this part ranged between zero and 44 pc with a mean of 14,3 pc. The area consisted of the western part of Zimbabwe and suffered from drought. Natural water bodies are rare and schistosomiasis transmission is very low.

Section D: A medium prevalence zone of S. mansoni: The average rate of infection was 15,2 pc in the north and south-eastern parts of the country.

Section E: A low prevalence zone of *S. mansoni* infection: The mean prevalence of one and a half pc was found in the rest of the country. The results reported above were further strengthened by the following malacological findings.

A survey of fresh water snails was done in Zimbabwe in the year 1988 by Makura and Kristensen.[11] Their findings still to be published showed that *Biomphalaria pfeifferi*, intermediate host for *S. mansoni*, is highly prevalent in the north-east of the country. This correspondent with section D mentioned above. A light distribution was noted in the south east where there was a very low prevalence of the disease. Similarly, *Bulinus globus*, intermediate host snail for *S. haematobium*, was highly prevalent in the north-east and south-east of the country, with patchy distribution in the south-west. The distribution of the *B. golbus* snails matched that of *S. haematobium* infection in humans.

**PILOT PROJECTS SET UP TO CONTROL SCHISTOMIASIS: 1.Schistosomiasis control in larger irrigation schemes:** Schistosomiasis control in large irrigation schemes was practised for more than 30 years and considerable experience was gained from the large irrigation sugar estates in the low-veld.[16] The main method used was snail control using niclosamide.[9] Lately, molluscicide has been supplemented by the use of ducks and devegetation to reduce snail numbers.[10] In addition, villagers are provided with safe water and sanitation facilities and health education lectures. Chemotherapy is rendered to people found infected.

These measures have managed to keep the incidence of infection to between zero and four and a half pc [10] where as the incidence is 45pc in other schemes where control measures were not implemented.

2. **Control in small holder irrigation schemes:** The resettlement programme being undertaken by the Zimbabwe government has resulted in the creation of a number of small-holder irrigation schemes. One of the most prominent is the Mushandike scheme which is situated 20 km south-west of Masvingo.[5] Water for the farms is drawn from Mushandike dam and the main canal which was built in 1930. There is a single rainy season (November to March), irrigation is essential to supplement the low rainfall and to provide water during the dry season.[5]

Measures to control schistosomiasis were as follows; a) Engineering designs. Engineering measures were aimed at preventing snail colonisation and breeding.[1] This entitled lining of secondary and tertiary canals using concrete. In addition, certain hydraulic structures in the canal, such as sluice gates, weirs, and offtakes were implemented to reduce the damming effect which reduced water flow.[7] Furthermore, operational aspects of the irrigation works, regular drying of the canals, water level fluctuation in the storage reservoirs, routine maintenance such as removing stones or soil obstructions, weed clearance and preventing water seepage were incorporated to minimize snail populations in the scheme.[1]

b) Environmental measures. Environmental control measures were aimed at reducing human water contact and contamination of surface water.[6,8] Villagers were sited as far away as possible from potentially infected water. Boreholes fitted with hand pumps were installed near each village and away from the dams and canals. Villagers were persuaded not to use canal water for domestic purposes.[5]

Sanitation facilities in the form of communal in-field pit latrines were built in the irrigated areas. People found infected at the start of the programme were treated to reduce contamination of the environment and infection of snails.

Results of monitoring reported by Chandiwana *et al*,[5] showed that there was over 53 pc reduction in *S. haemotobium* prevalence from the time of the implementation of the control measures. Similarly, there were marked reductions (100 pc) in the prevalence of *S. mansoni*. No comparable reductions were recorded in an area where control measures were not implemented in spite of treating infected people.

The parasitology results above were supported by a reduction in both snail population densities and their infection rates.

3. **Community based schistosomiasis control project:** A Primary Health Care (PHC) based schistosomiasis control pilot project was undertaken from 1986 by BRI. The main objective of the project was to develop and evaluate an integrated community-based schistosomiasis control programme within the PHC system. Details of the programme are reported elsewhere.[20]

The study areas were at Madziwa and Bushu Communal Lands in Chaminuka District of Mashonaland Central Province and the project was implemented through participation with the following components:

**A.** Sanitation: The Madziwa community, agreed to build one Blair toilet per family, that meant a total of 3 000 toilets had to be built. The programme was a success as 2 152 units were completed using self-help by the families.

**B.** Water Supply: The project aimed at providing one protected water point for every 25-30 families. Digging and maintenance of the pump was to be done by the community, while the Ministry of Health (MOH) provided the pumps. This programme was initially slow but by completion of the project, 104 of the targeted 150 boreholes had been completed and handpumps installed.

**C.** Health Education: Local health authorities and Village Community Workers (VCMs) had the task of educating the community on schistosomiasis and its relationship with hygiene, safe water and sanitation. The health message was well received.

**D.** Snail Control: A single application of a synthetic molluscicide, (niclosamide) was applied at major water contact points and reductions in snail population densities were noted.

**E.** Chemotherapy: Chemotherapy was the only direct health service provided by the project staff, and was directed at infected school children. To monitor the effect of the control measures, parasitology surveys, for both *S. haematobium* and *S. mansoni*. were done yearly. In terms of overall achievement, treatment had a marked effect on prevalence. Incidence results showed that a community approach to the control of schistosomiasis was successful at Madziwa.[20] Results of this project indicated that schistosomiasis control requires interdisciplinary collaboration, constant community participation and unfortunately a major financial commitment from the already limited health budget.[20]

Zhulube Schistosomiasis Control Project: Control activities in the Matabeleland South province were concentrated at Zhulube which has irrigation canals and a river running near the village.[12]

The main thrust of the control strategy was improvement of water and sanitation facilities. Blair toilets were constructed and wells were upgraded. Swampy areas were turned into vegetable gardens.

Other control measures included health education which was targeted at school children who in turn passed the message to the parents. In addition, infected individuals received treatment and molluscicide was performed at water contact sites where infected intermediate host snails were found.

All these control measures contributed to a 50 pc reduction in the prevalence of *S. haemotobium*. No *S. mansoni* was detected in the area.[12] From the results of the pilot programmes, a strategy for schistosomiasis control has now been established in Zimbabwe.

Zimbabwe Strategy for the Control of Schistomiasis: The government of Zimbabwe has adopted a PHC-based strategy for schistosomiasis control and the broad objectives are control of morbidity. Within these objectives, a multi-component strategy, using snail control, safe water supplies, adequate sanitation and some aspects of snail control, are embodied within the PHC system.

The Basic Outline of the Control Strategy: The outline for the National Schistosomiasis Control to be done at Provincial level is shown in Tables I-III.

*Table I: Showing the activities to be undertaken during the preparatory phase (Problem analysis).*

| ACTIVITY | TIME CONDUCTED |
|---|---|
| Administer questionnaire on knowledge and attitudes towards schistosomiasis | August 1992–December 1992 |
| Collection of necessary epidemiological, demographic and health services data. | August 1992–December 1992 |
| Surveys of safe water supplies and sanitation units. | June 1991–May 1992 |
| Planning of operational and managerial structures | January 1992–July 1992 |
| Setting up of data banks. | July 1992 |
| Definition of feasible and effective long term intervention measures | May 1992–June 1992 |
| Training of peripheral health staff in diagnosis and control of schistosomiasis. | July 1992 |
| Training of middle level managers to sustain the programme at province and district level. | May 1992–June 1992 |

*Table II: Showing activities during the intervention period.*

| ACTIVITY | TIME CONDUCTED |
|---|---|
| Health education by peripheral health staff and school teachers in control of schistosomiasis | From July 1992 |
| Improving and providing safe water supplies sanitation units. | From 1992 onwards |
| Selective chematherapy of infected people. | October 1992 |

*Table III: Consolidation and Evaluation (Phase 3)*

| ACTIVITY | TIME CONDUCTED |
|---|---|
| Consolidate and ensure that all the intervention measures are maintained. | |
| EVALUATION; | |
| Administer a questionnaire on knowledge and attitudes to schistosomiasis. | January 1995 —December 1995 |
| Conduct a survey to find the incidence, prevalence and intensity of human schistomiasis | |
| Undertake a check-list of the water and sanitation units available in each area. | |

All programmes in this area rely on community participation as the major input into the implementation. The community is responsible for the provision of all labour, bricks and the long term maintenance of the facilities.[19]

## DISCUSSION

The pilot projects and the Government strategy for schistosomiasis control will go a long way in reducing prevalence and morbidity due to schistosomiasis infection in Zimbabwe.

However, there is still need for closer intersectoral co-operation between various governmental departments, provinces, donor agencies, as well as closer integration between the schistosomiasis control programme and the ongoing PHC activities.

## ACKNOWLEDGEMENTS

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