

Short Communication

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Teachers-Centred Distribution of Praziquantel to Control Schistosomiasis in Gezira State, Sudan

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ABSTRACT

Schistosomiasis is a major public health problem in Gezira State, Sudan. The state-wide prevalence survey among school children showed that the prevalence reached up to 82% in some districts and the reported mean intensity reached up to 223 eggs/gm of stool for *S. mansoni* and 28 eggs/10 ml of urine for *S. haematobium*. Based on this, a plan was established to control schistosomiasis. A teacher-centered distribution of praziquantel was organized in 22 districts targeting school pupils only. This short communication describes the intervention, the coverage and lessons learnt. With negligible cost and minimal efforts the target coverage of school pupils with praziquantel was reached by teachers in a demonstrable short time. In the successive two rounds the coverage exceeded 90% of the target school enrolled children. This approach can be extended to target all school and preschool children plus children not attending school in the state, as they represent a very important reservoir for schistosomiasis and soil transmitted helminthes.

KEYWORDS: Schistosomiasis; Praziquantel; Teacher-centred; schistosomiasis control; Sudan.

BACKGROUND

Schistosomiasis is one of the neglected tropical diseases that constitute a major public health problem in many developing countries.¹ The first reported cases in Sudan dated back to 1920s with an increasing incidence over time.^{2,3} Recent surveys (unpublished data) showed that the disease is prevalent all over the country with varying intensity. Both *S. mansoni* and *S. haematobium* are present. The disease reflected itself at hospital level as cases of periportal fibrosis, oesophageal varices and ascites and a significant death rate.⁴

As part of the schistosomiasis control programme activities, a survey was conducted according to WHO guidelines¹ in Gezira State in November 2011 to map the disease prevalence. With exception of only 5 districts, the 37 remaining districts in the state reported either *S. mansoni* or *S. haematobium* or both. The overall prevalence reached up to 82% in some districts and the reported mean intensity reached up to 223 eggs/gm of stool for *S. mansoni* and 28 eggs/10 ml of urine for *S. haematobium*.⁵ Based on this a plan was established to control schistosomiasis. The grave situation was attributed to canals providing excellent habitats for snails, a lack of safe water supply and latrines in some areas, poor socioeconomic status of residents in the irrigated areas and interrupted control interventions.

LOCAL SETTING

Gezira state, located in central Sudan, is one of the 18 states in the country with an area of 26,075 square kilometer and a population of around 4 million. The state is divided into 8 localities that are further divided into 40 districts. People in the state are living in 2884 residential areas (villages, towns, cities and others). Those who are coming to the state as seasonal workers are living in unregistered villages (locally known as Kambo) near to villages and they are sharing health, education and other services with village communities. The main economic activities in the state are agriculture and animal breeding. There are 3 large agriculture schemes: ElGezira and ElManagil, ElRahad, and ElGineed. More small schemes are also there. In the state, there are over 2000 basic schools accommodating around one million pupils.

HISTORICAL PERSPECTIVES

Sudan and Egypt were the first countries who have tried to control schistosomiasis in Africa.⁶ Historically there were many attempts to control schistosomiasis in Gezira State; the most famous and most recent is the Blue Nile Health Project (BNHP, 1979-1989). BNHP was supported by WHO, World Bank, USAID, Japan, Kuwait and government of Sudan, and their activities succeeded to reduce the prevalence of schistosomiasis from over 50% to 61% by 1989⁷ in covered areas. Following the ending of external support, control activities were continued depending on local resources but they were scattered, unsustainable and inefficient.⁸ The Ministry of Health, Gezira State (MOH) recently decided to again focus on the problem and has developed a programme integrating praziquantel treatment with other control measures where enough evidence exists of their effectiveness.⁹ In 2012 and 2013 the programme was supported by the National Ministry of Health and its partners. The main intervention was preventive chemotherapy (mass distribution of praziquantel) targeting school pupils all over the state in addition to the whole population of communities in 18 of the 40 districts. Other control interventions addressed through collaboration with concerned partners include snail control, working with water sector to avail safe water supply, increasing access to proper disposal of excreta (latrines), improving diagnosis and case management in all health centres and rural hospitals, and health education.

CURRENT APPROACH AND RESULTS ACHIEVED

In line with the World Health Assembly resolution no. 54.19 in 2001 that at least 75% of school-age children in high-burden regions should be treated regularly with praziquantel¹⁰ and bearing in mind the past experience of schistosomiasis control in Sudan and in Gezira State, the State Ministry of Health involved school teachers in distribution of praziquantel to school children. The programme was implemented jointly between the Ministry of Health and the Ministry of Education in 22 districts. From each school one teacher was nominated by the Ministry of

Education to carry out the assigned activities as a volunteer. All nominated teachers in a locality attended a one-day training held at the capital of the locality. Training covered all issues related to disease transmission, control, praziquantel dosage and possible side effects, what to do in case of adverse reaction, height measuring and dosage calculation and reporting. Staff from the schistosomiasis control programme at the Ministry of Health delivered the training sessions and provided the training materials. All costs (transport, meals and training material) were covered by the Ministry of Health. This ranged between \$10-12 USD given per teacher (per school). By the end of the training session, each teacher was provided with enough quantity of praziquantel tablets to cover all pupils in his/her school, forms for reporting to the MOH and written dosing guidelines. Agreement was reached with trained teachers to return directly to their schools and distribute, within 2-3 days, praziquantel to the target pupils and immediately send back reports. The Ministry of Education office at each locality collected the reports and sent them to the Ministry of Health. So by the end of the week all reports reached the Ministry of Health.

School-based schistosomiasis control programme is not a new approach and has been successfully implemented in many countries.¹¹⁻¹³ However, depending solely on trained school teachers for leading a school-based distribution of praziquantel and reporting back to health authorities under the supervision of Ministry of Education is an approach that this article is intended to highlight.

A very satisfactory achievement was reported in two successive rounds. In 2012 a total of 1306 teachers (one for each school) were trained and provided with praziquantel and they covered 316,539 pupils (representing 93% of the target). In 2013, the target of schools was revised and a total of 875 teachers were trained and provided with praziquantel. They covered 295,323 pupils (90%). The trained teacher in each assigned school has sent a verbal message to the parents through the pupils about the campaign and its timings. They moved from class to class, assisted by other teachers, thus covering all pupils. A team composed of health and education staff from state and locality visited a random sample of schools to acknowledge the teachers and to support their efforts. Reported side effects of the drug in both years were negligible and were mostly mild abdominal discomfort.

In Gezira State coverage with health facilities is adequate but health personnel are limited in type and number, so it is difficult for health workers to work outside their health facilities. In fact, the BNHP experience showed that the cost of involving health workers is very high. For that reason the Ministry of Health considered involving teachers in the distribution of praziquantel to school children. The other reason is that schools are widely distributed and teachers have strong links with the community and they are accepted by parents and children as proved in Ghana and Tanzania.¹⁴ This may explain the above mentioned high coverage rate. However, lack of teachers sup-

port (with other factors) lead to very low uptake in Uganda.¹⁵ So training and careful selection of teachers is needed. In this experience the health workers welcomed the involvement of teachers and agreed to provide support to them when they asked for help. In Nigeria, while the community accepted teachers as drug distributors, the health staff and officials at the Ministry of Health and the Ministry of Education were willing to involve teachers as organizer for the campaign not as drug distributors.¹⁶

LESSONS LEARNT

Sustainable control of neglected tropical diseases requires long-term political and institutional commitment and as well integration into primary health care system.¹⁷ Depending mostly on external support may be followed by a disastrous situation after completion of the funding period if the available local resources are not adequate as in the case after termination of the BNHP.^{7,8} As praziquantel will be available free of charge for several years from the Merck company, the Ministry of Health felt the need for an appropriate channel of distribution particularly for school and preschool children and hence this approach was initiated.

Teachers-centred distribution of praziquantel to school children will certainly contribute to the sustainability and success of the schistosomiasis control programme, as schools and teachers are public health resources that are widely spread and deeply rooted in the communities. The two rounds of experience demonstrated that the target can be reached and covered in a very short time with negligible cost. The Ministry of Health has therefore decided to expand the programme to cover all school children in the state. So, during 2014 plans are set to cover one million school children in about 2000 basic schools in only one week.

The experience of African Programme of Onchocerciasis Control (APOC) based on community-directed interventions, proved that success can be achieved and sustained provided that the suitable and appropriate mode of delivery was used.¹⁸ The community drugs distributors in APOC experience were volunteers and the activities more or less concentrated in rural areas.¹⁹ In the Sudan approach, teachers covered both rural and urban settings, in fact the majority of pupils are in urban schools.

The high uptake of praziquantel by pupils, the experience of two years implementation without reported severe side effect or bad experience combined with acceptance of parents, showed that this strategy can be extended to cover the preschool children also involving their teachers. Such an approach can open the door to include soil transmitted helminthes as preschool pupils are the primary target for de-worming,²⁰ especially since antihelminthics currently in use for preventive chemotherapy are also donated and have negligible side effects.

The key element in the success of this experience is the strong collaboration between the Ministry of Health and the Ministry of Education and this was considered essential for de-

worming programmes.²⁰ In fact the distribution of praziquantel described in this article is only a new area of collaboration between the two ministries. The two ministries have collaborated in a school health programme which conducts medical screening for all the newly admitted pupils (around 100,000 pupils) every year for the last 4 years.

CONCLUSIONS

Teachers-centred approach to provide praziquantel to school children as part of schistosomiasis control programme is a rapid, efficient and effective approach. The high uptake by pupils and the acceptance of parents to the idea paves the road to include preschool settings and use the same approach in addressing more health problems, particularly soil transmitted helminthes. However, the well established collaboration between education and health authorities is the key factor in the success. For the next 5 years we intend to make use of the Merck donation of praziquantel and head towards elimination of schistosomiasis.

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REFERENCES

1. WHO. Prevention and control of schistosomiasis and soil-transmitted helminthiasis: report of a WHO expert committee. *WHO Tech Rep Ser* number 912. Geneva: World Health Organization, 2002.
2. el Gaddal AA. The Blue Nile Health Project: a comprehensive approach to the prevention and control of water-associated diseases in irrigated schemes of the Sudan. *J Trop Med Hyg.* 1985; 88(2): 47-56.
3. Balfour A. *First Report of Wellcome Research Laboratories.* Khartoum, Sudan Government; 1904.
4. Kheir MM, Eltom IA, Saad AM et. al. Mortality due to Schistosomiasis mansoni: a field study in Sudan. *Am J Trop Med Hyg.* 1999; 60(2): 307-310.
5. Abdalla AH, Malik EM, Babiker AO, Eltayeb M, Mohamed AI, Adam I. Geographical distribution and prevalence of schistosomiasis in Gezira State, Sudan [Abstract in English]. [In Arabic]. *Health and Development Journal.* 2012; 1(1): 12-17. Web site. <http://mohgs.gov.sd/journal/7.pdf>.

6. Fenwick A, Rollinson D, Southgate V. Implementation of human schistosomiasis control: challenges and prospects. *Adv Parasitol.* 2006; 61: 567-622. doi: [10.1016/S0065-308X\(05\)61013-5](https://doi.org/10.1016/S0065-308X(05)61013-5)
7. Humaida S, Gaddal AAEL, Homeida MMA. Schistosomiasis: epidemiology and burden of disease in the Sudan. *Sudan Med J.* 2011; 47(2): 63-68.
8. Amin MA, Elhussin DM. Challenges in prevention and control of schistosomiasis in the Sudan. *Medical Journal of Omdurman Islamic University.* 2009; 4(1): 79-83. doi: [10.4314/sjms.v4i1.44885](https://doi.org/10.4314/sjms.v4i1.44885)
9. Gray DJ, McManus DP, Li Y, Williams GM, Bergquist R, Ross AG. Schistosomiasis elimination: lessons from the past guide the future. *Lancet Infect Dis.* 2010; 10(10): 733-736. doi: [10.1016/S1473-3099\(10\)70099-2](https://doi.org/10.1016/S1473-3099(10)70099-2)
10. WHO. World Health Assembly Resolutions and Decisions. Web site http://www.who.int/neglected_diseases/mediacentre/WHA_54.19_Eng.pdf. Accessed. Aug 22, 2014.
11. Mafé MA, Appelt B, Adewale B, et al. Effectiveness of different approaches to mass delivery of praziquantel among school-aged children in rural communities in Nigeria. *Acta Trop.* 2005; 93(2): 181-190. doi: [10.1016/j.actatropica.2004.11.004](https://doi.org/10.1016/j.actatropica.2004.11.004)
12. Touré S, Zhang Y, Bosqué-Oliva E, et al. Two-year impact of single praziquantel treatment on infection in the national control programme on schistosomiasis in Burkina Faso. *Bull World Health Organ.* 2008; 86(10): 780-787. doi: [10.1590/S0042-96862008001000014](https://doi.org/10.1590/S0042-96862008001000014)
13. Salam RA, Maredia H, Das JK, Lassi ZS, Bhutta ZA. Community-based interventions for the prevention and control of helminthic neglected tropical diseases. *Infect Dis Poverty.* 2014; 3: 23. doi: [10.1186/2049-9957-3-23](https://doi.org/10.1186/2049-9957-3-23)
14. Brooker S, Marriot H, Hall A, et al. Partnership for Child Development. Community perception of school-based delivery of anthelmintics in Ghana and Tanzania. *Trop Med Int Health.* 2001; 6(12): 1075-1083. doi: [10.1046/j.1365-3156.2001.00806.x](https://doi.org/10.1046/j.1365-3156.2001.00806.x)
15. Muhumuza S, Olsen A, Katahoire A, Nuwaha F. Uptake of preventive treatment for intestinal schistosomiasis among school children in Jinja district, Uganda: a cross sectional study. *PLoS One.* 2013; 8(5): e63438. doi: [10.1371/journal.pone.0063438](https://doi.org/10.1371/journal.pone.0063438)
16. Nwaorgu OC, Okeibunor J, Madu E, Amazigo U, Onyegegbu N, Evans D. A school-based schistosomiasis and intestinal helminthiasis control programme in Nigeria: acceptability to community members. *Trop Med Int Health.* 1998; 3(10): 842-849. doi: [10.1046/j.1365-3156.1998.00313.x](https://doi.org/10.1046/j.1365-3156.1998.00313.x)
17. Zhang Y, MacArthur C, Mubila L, Baker S. Control of neglected tropical diseases needs a long-term commitment. *BMC Medicine.* 2010; 8: 67. doi: [10.1186/1741-7015-8-67](https://doi.org/10.1186/1741-7015-8-67)
18. Amazigo U. The African Programme for Onchocerciasis Control (APOC). *Ann Trop Med Parasitol.* 2008; 102Suppl 1:19-22. doi: [10.1179/136485908X337436](https://doi.org/10.1179/136485908X337436)
19. WHO. African Programme of Onchocerciasis Control (APOC): Community drug Distributors (CDDs). Web site. <http://www.who.int/apoc/cdti/cdds/en/>. Accessed. September 11, 2014.
20. Albonico M, Montresor A, Crompton DW, Savioli L. Intervention for the control of soil-transmitted helminthiasis in the community. *Adv Parasitol.* 2006; 61: 311-348. doi: [10.1016/S0065-308X\(05\)61008-1](https://doi.org/10.1016/S0065-308X(05)61008-1)