Onchocerciasis control in South Sudan

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This paper gives an overview of the Community Directed Treatment with Ivermectin (CTDI) projects in 2009. Data from the 2010 report will be published when it is available. Box 1 at the end of this article gives treatment guidelines.

Background

Onchocerciasis is an insect-borne disease caused by the parasite *Onchocerca volvulus* and transmitted by blackflies of the species *Simulium damnosum*. It is often called 'river blindness' because the blackfly lives in fertile riverside areas, that frequently remain uninhabited for fear of infection. *Onchocerca volvulus* is almost exclusively a parasite of humans. Adult worms live in nodules in the body where the female worms produce large numbers of first-stage larvae known as microfilariae. These migrate from the nodules to the sub-epidermal layer of the skin where they are ingested by blackflies. The microfilariae develop in the body of the blackfly and are transmitted to humans when the fly bites them (1).

Microfilariae cause eye lesions in humans. They are found in all the internal tissues of the eye, except the lens, where they cause inflammation, bleeding, and other complications that ultimately lead to blindness (1). The patient initially complains of itching, but blindness results from chorioretinitis and optic neuritis.

Between 1995 and 2002, Rapid Epidemiological Assessment (REA) was conducted in South Sudan by various Non-Government Organizations (NGOs) supporting Onchocerciasis Control in areas where they provided health services. However, in 2003, the African Program for Onchocerciasis Control (APOC) in collaboration with the Southern Sudan Onchocerciasis Task Force carried out Rapid Epidemiological Mapping of Onchocerciasis (REMO) in the country, partly to validate available historical epidemiological data (2). Results confirmed that onchocerciasis was a disease of public health importance in the country (3).

Current activities

Activities to control onchocerciasis were started in the mid-1990s and Community Directed Treatment with Ivermectin (CTDI) projects were developed at the inception of the autonomous Government of Southern Sudan in 2005. There are currently five CTDI projects. Onchocerciasis is endemic in all the states except Unity State. The main endemic foci are located in Western Equatoria, Northern Bahr el Ghazal and Western Bahr el Ghazal (3) . In some villages more than 80% of individuals have palpable nodules and more than 12% are blind (4).

Training

In 2009, a total of 9,268 Community Directed Distributors (CDDs), 1,094 Health Workers and 1,253 Community Leaders were trained on onchocerciasis activities (5).

Planned coverage

Over the five CDTI project areas:

- Total population targeted = 5,605,726
- Ultimate Treatment Goal (UTG) = 4,708,810 people
- Annual Treatment Objective (ATO) = 3,019,766 people.

Figure 1 shows the planned coverage by CDTI project.

Actual coverage

A total of 5,701 villages have been treated out of 6,503 endemic villages giving a geographical coverage of 87.7% see Figure 2. The total population that has been treated is 3,012,058 giving a therapeutic coverage of 53.7% - see Figure 3 (5).

Discussion

Much progress has been made in fighting onchocerciasis in the five project areas through annual distribution of ivermectin. This relieves the severe skin itching caused by the disease. Ivermectin kills the larvae but not the adult worms of *Onchocerca volvulus* so annual or biannual treatments are required to prevent resurgence. However, studies in Mali and Senegal showed that after 15 to 17 years of six-monthly or annual treatments, only a few infections remained in the human population (6).

The Ministry of Health, South Sudan has now embarked on an Integrated Neglected Tropical Disease Control strategy for sustainable and effective interventions to combat the human suffering caused by Neglected Tropical Diseases (NTDs) (7). One method, applicable to

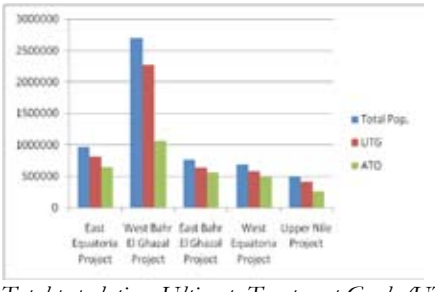

Figure 1. Total population, Ultimate Treatment Goals (UTG) and Annual Treatment Objectives (ATO) in the CTDI projects.

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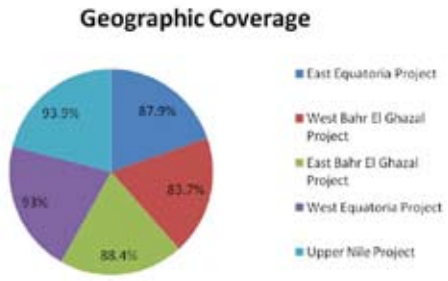

Figure 2. Geographical coverage in the CDTI projects.

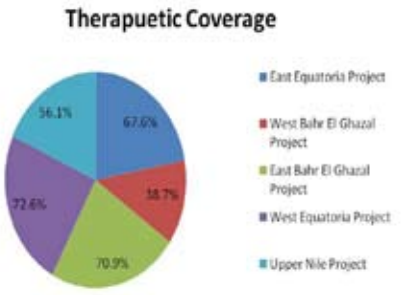

Figure 3. Therapeutic coverage in CDTI projects.

the control or elimination of seven NTDs – lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminths (i.e. ascariasis, trichuriasis and hookworm disease) and trachoma – is Mass Drug Administration (MDA) of Preventive Chemotherapy (PCT) through an integrated approach (8).

MDA Packages

The MDA Packages will contain any of five drugs - ivermectin, praziquantel, albendazole (or mebendazole), azithromycin, tetracycline - depending on the co-endemicity of diseases and whether the intervention threshold is exceeded. For areas where helminth diseases - onchocerciasis, lymphatic filariasis, schistosomiasis and soil-transmitted helminths – are co-endemic, administration of a MDA package will be relatively straightforward, because all of the required drugs have been cleared for co-administration. However praziquantel should only be administered alongside other anthelminths after at least one separate round of MDA, to avoid adverse events in individuals with high worm loads. Where trachoma is endemic, a minimum of one week has to elapse between administration of antihelminth and azithromycin, because there is insufficient information to guarantee the safe co-administration of these drugs. Areas endemic for lymphatic filariasis and highly endemic for *L. loa*, but not onchocerciasis, will be excluded from MDA packages as the risk of adverse events is thought to outweigh the advantages of treatment (7).

In implementation units where the intervention threshold for a particular disease or combination of diseases has been exceeded, presumptive treatment will be delivered. This means that no diagnostic tool will be used and that a large number of infected and uninfected people will be treated. In areas where only helminth diseases are being treated this is feasible because anthelminths have an excellent safety record, adverse reactions are minimal and transient, and severe adverse effects are extremely infrequent (7, 8).

Though this presents great challenges, it also offers great potential to increase treatment coverage for co-endemic NTDs, integrate more complex case-management into facility-based health care delivery and strengthen the link between communities and health facilities. This unprecedented opportunity to build evidence-based systems for NTD control or elimination needs to be maximised now while rebuilding of the health sector is ongoing (9).

References:

1. World Health Organization. Priority Eye Diseases, Onchocerciasis. 2001. http://www.who.int/blindness/causes/priority/en/index3.html

2. African Program for Onchocerciasis Control (APOC). 2005. Rapid assessment of loiasis and onchocerciasis in Southern Sudan. Mission Report.

3. Ministry of Health, Government of Southern Sudan. 2008. Neglected tropical diseases and their control in Southern Sudan. Situation analysis, intervention options, appraisal and gap analysis.

4. Mukhtar MM et al. The Burden of Onchocererca volvulus in Sudan. *Ann. Trop. Med. Parasitol.* 1998 92 (Suppl. 1): 129-131.

5. Southern Sudan Task Force Annual Report. 2009.

6. World Health Organization. Elimination of river blindness feasible: WHO study shows that areas in Mali and Senegal require no further mass treatment. WHO TDR. 2009 21 July at http://dx.plos.org/10.1371/journal.pntd.0000497

7. Integrated Control of Neglected Tropical Diseases. National Strategic Plan, Southern Sudan. 2008-2011

8. World Health Organization. Preventive Chemotherapy in Human Helminthiasis: coordinated use of anthelminthic drugs in control interventions: a manual for health professionals and programme managers. WHO, Geneva. 2006.

9. Rumunu J. et al. Southern Sudan: An opportunity for NTD control and elimination? *PubMed. Trends Parasitol;* 2009. 25(7): 301–307.

Box 1. Recommended treatment guidelines using Ivermectin

Body weight (kg)	Body length (cm)	IVM Dose	Route
15-25	90-119	1 tablet (3mg)	Oral once
26-44	120-139	2 tablets (6mg)	Oral once
45-64	140-159	3 tablets (9mg)	Oral once
65 and above	160 and above	4 tablets (12mg)	Oral once