Int Health 2017; **9**: 263–266
doi:10.1093/inthealth/ihx025 Advance Access publication 6 July 2017

SHORT COMMUNICATION

Mass drug administration in Central Equatoria, South Sudan: results and suggestions for future distributions

Giuseppina Ortu[a,*], Jamshed Khan[b], Makoy Samuel Yibi[c] and Ismail Abdu Nimaya[d]

[a]Malaria Consortium, Development House, 56-54 Leonard street, London EC24 4LT, UK; [b]Malaria Consortium, South Sudan Office, Plot 367, Block 3-K South, Tong Ping, Juba, South Sudan; [c]Ministry of Health, Guinea worm eradication and preventive chemotherapy – Neglected Tropical Disease Department, South Sudan; [d]Ministry of Health, Neglected Tropical Disease department, South Sudan

*Corresponding author: Tel: +44 20 7549 0210; E-mail: g.ortu@malariaconsortium.org

Received 27 January 2017; revised 5 June 2017; editorial decision 7 June 2017; accepted 26 June 2017

Background: South Sudan has rolled out a neglected tropical disease programme, which envisaged deworming campaigns in states endemic for soil transmitted helminth infections and schistosomiasis.

Methods: In 2016, two deworming campaigns targeting school-age children were performed in Central Equatoria. Distribution sites were set up in primary schools, Boma Health Initiative headquarters, health centres and markets. Training, radio adverts and community meetings were performed before the campaigns.

Results and Conclusions: Central Equatoria implemented the first helminth infections and schistosomiasis treatment campaign, achieving a satisfactory programme coverage (>90%). Setting up drug distribution sites and engaging the Boma Health Initiative are recommended approaches for future campaigns.

Keywords: Albendazole, Deworming, Praziquantel

Introduction

South Sudan established a national neglected tropical disease (NTD) programme in 2008.[1] Disease mapping[2] carried out across Central Equatoria showed the state to be endemic for schistosomiasis (SCH) and soil-transmitted helminths infections (STH). Based on these epidemiological data (Table 1), routine deworming campaigns were to be rolled out targeting school-age children and, in some counties, adults as well. To the best of our knowledge, deworming treatments using albendazole (ALB) were performed during vaccination campaigns, targeting children under 5 years; school-age children and/or adults did not receive any treatment for STH. For SCH, only occasional treatments were delivered in primary schools in Juba in 2010.

In 2016, based on the National Master Plan objectives, Malaria Consortium, a UK-based non-governmental organisation, and the Ministry of Health (MoH) rolled out the first distribution of ALB and praziquantel (PZQ) in Central Equatoria, targeting school-age children. This paper briefly summarises the results from the deworming campaigns and provides suggestions for future campaigns.

Materials and methods

South Sudan is divided into states, counties and payams (see Supplementary Figure 1). Payams are made up of bomas—a group of villages, considered the smallest administrative division (with an average area of roughly ~22 km^2). The number of villages per boma varies greatly due to internal migration (especially during political instability) and the list is routinely updated at the payam level.

Two mass administrations campaigns (MDAs) were organised: one targeting Kajo Keji, Yei and Lainya counties, and the second one targeting Terekeka county and 10 out of the 16 payams of Juba. Morobo county and the other six payams in Juba were not targeted for security reasons. Although for some counties epidemiological data suggested ALB treatment was needed for both school-age children and adults, the national NTD Master Plan envisaged deworming treatment of school-age children as a priority; hence, only this group was targeted.

Based on the experience of other countries,[3] the setting up of drug distribution sites was adopted as the most appropriate strategy for this campaign. Drug distribution points set up by health staff, community drug distributors (CDDs) and teachers

were located in primary schools, and health centres; other sites well known to the population such as markets, were also used as distribution points. As there were not sufficient primary health care structures and primary schools, there was the risk of not being able to reach the whole targeted population in each boma. The recent development of the Boma Health Initiative (BHI),[4] a community health structure launched by the MoH, provided the opportunity to use also BHI headquarters as sites for drug distribution, increasing the total number of drug distribution sites in each boma.

Primary school teachers and CDDs were selected for the MDA training by the MoH and the BHI representatives. The BHI representatives also helped with the selection of CDDs in the community that were able to read and write. A cascade training was organised, with one training of trainers (ToTs) followed by concomitant trainings delivered in several locations for staff responsible for drug distribution. Training material included information about a) life cycle of worm infections, b) signs and symptoms of these infections, c) disease prevention measures, d) importance of deworming campaigns, e) guidance on how to provide and record treatment, f) details on how to monitor for side effects and record them, and g) how to answer to community questions. The ToTs training also included recommendations on how to train drug distributors on MDAs and the role of MDA supervisors.

A month before distribution, local radio stations promoted the campaign every day, and several times a day, clarifying a) the target population, b) the location of distribution sites, c) the importance of attending MDA, d) the importance of eating before treatment, and e) any likely side effects. Community awareness meetings were organised in each payam, to which representatives of the BHI and local community groups were invited. At these meetings, messages already delivered via radio were repeated.

Results and Discussion

Each drug distribution was run over five days. During the campaigns, supervisors from the MoH and Malaria Consortium visited distribution sites to ensure that drugs were sufficient, treatment forms were filled in correctly and side effects were recorded. After the first two days, where attendance was decreasing at certain sites, distribution teams were advised by the supervisors to move to another site within the boma to cover different areas (e.g., another market). During the second campaign, some primary schools closed due to exams and teams were advised to add house-to-house distribution, if needed.

Tables 1 and 2 summarise the deworming campaigns, outlining the estimated population of school-age children (based on Education Management Information System population data [EMIS]),[5] number of treatments at sites and in primary schools, programme coverage, and side effects. Based on population data of children enrolled in primary schools (45.9%), and estimation of children not enrolled (54.1%), the use of distribution points in schools and in BHI headquarters, health centres and markets did succeed in reaching almost all targeted children, including those out of school, highlighting the effectiveness of this distribution approach. The programme coverage was 91% during the first MDA and 133% during the second one. The high programme coverage obtained, especially in Juba, may be

Table 1. Summary of disease prevalence, estimated population of school-age children, targeted bomas and trained drug distributors

County	Soil-transmitted helminth infection prevalence (%)	Schistosomiasis prevalence (%)	Actual population of school-age children enrolled in primary schools (45.9% of total school age children)[a]	Estimated population of school-age children not enrolled in primary schools (54.1% of total school age children)[a]	Estimated total population of school-age children	Number of bomas (as per administrative system used until 2016)	Number of trained drug distributors (teachers and CDDs)
Kajo Keji	31.40	20.56	29 513	34 785	64 298	31	264
Lainya	67.75	16.90	11 221	13 226	24 447	15	132
Yei	53.05	34.03	42 408	49 984	92 392	22	251
Total			83 142	97 995	181 137	68	647
Juba (10 payams)	39.52	21.62	61 845	72 893	134 738	93	536
Terekeka	16.73	29.62	27 702	32 651	60 353	52	236
Total			89 547	105 544	195 091	145	772

[a] Registration data collected by the Education Management Information System (EMIS) in year 2015; population of school age children includes children between the age of 5 and 14 years

Table 2. Summary of albendazole (ALB) and praziquantel (PZQ) treatments, programme coverage and reported side effects

County	Number of individuals treated with ALB – in sites other than schools	Number of individuals treated with ALB – in primary schools	Number of individuals treated with ALB – total	ALB programme coverage[a]	Number of individuals treated with PZQ – in sites other than schools	Number of individuals treated with PZQ – in primary schools	Number of individuals treated with PZQ – total	PZQ programme coverage[a]	Number of side effects
Kajo Keji	0	60 198	60 198	94%	0	60 197	60 197	94%	696
Lainya	4101	17 359	21 460	88%	5078	18 857	23 935	98%	110
Yei	12 509	70 512	83 021	90%	13 015	71 202	84 217	91%	344
Total treatments MDA 1 (April 2016)	16 610	148 069	164 679	91%	18 093	150 256	168 349	93%	1 150
Juba (10 payams)	133 362	59 363	192 725	143%	130 074	59 797	189 871	141%	424
Tarekeka	63 363	3747	67 110	111%	61 403	3747	65 150	108%	475
Total treatment MDA 2 (Nov 2016)	196 725	63 110	259 835	133%	191 477	63 544	255 021	131%	899

[a] Calculated as the number of individuals in the target population ingesting the preventative chemotherapy drugs in designated endemic area (numerator) over all the individuals targeted for treatment in the designated endemic area (denominator) ×100

explained by the current political situation, in which population migration in this county may have impacted upon the population estimates calculated the year before. Furthermore, the pre-campaign advertisement carried out in Juba may have led to a number of children from non-targeted payams to access distribution sites in targeted areas and receive treatment, leading again to a programme coverage above 100%.

Mild side effects were reported by drug distributors in both campaigns. Drug distributors had food for children to be provided before treatment and oral rehydration solutions to help in managing vomiting and/or diarrhoeal cases (the most common side effects). It should be noted that immediately after the second campaign, as the ivermectin for onchocerciasis treatment was soon to expire, the MoH undertook the distribution of this drug using the logistics already in place for the deworming campaign. Side effects related to the second deworming campaign and ivermectin distribution were then combined and reported after the ivermectin campaign. Based on the MDA supervision reports, almost all side effects were related to the deworming campaign and not to the ivermectin distribution, supporting the hypothesis of a high schistosomiasis burden in individuals who had probably never received PZQ treatment. It would have been useful to collect side effect data immediately after the deworming campaign to separate the results from the deworming and onchocerciasis campaigns, but it was not possible.

The present study has some limitations, among them the political situation, which did not allow us to treat the whole of Juba and Morobo counties. Also, based on the prevalence data in each county, this MDA was supposed to be the first of a cycle of MDAs necessary for this state. Although the intervention was planned with the intention to continue the deworming programme, unfortunately, at the end of the second campaign, there were not sufficient financial resources to plan for the following MDAs.

Conclusions

Central Equatoria has taken an important step towards deworming school-age children. Considering that these SCH and STH treatment campaigns targeting primary school children were performed for the first time, results have been satisfactory. In-depth MDA training, frequent radio communications during the month before the campaign, the setting up of drug distribution sites supported by routine supervision during the activities and, above all, the engagement of the BHI for CDD recruitment, community sensitisation, and to support drug distribution, are suggested approaches for future MDAs to ensure good attendance and a satisfactory programme coverage.

Supplementary data

Supplementary data are available at *International Health* online (https://academic.oup.com/inthealth)

Authors' contributions: GO provided the training material, operational guidance and relevant data collection tools, and drafted the manuscript. JK, MSY and IAN run the operations in the country and reviewed and approved the manuscript. JK is the guarantor of the paper.

Funding: This work was supported by a UK Department for International Development Programme Partnership Arrangement grant. Funds were administered through Malaria Consortium.

Competing interests: None declared.

Ethical approval: Not required.

References

1 Rumunu J, Brooker S, Hopkins A et al. Southern Sudan: An opportunity for NTD control and elimination? Trends Parasitol 2009;25: 301–7.

2 Finn TP, Stewart BT, Reid HL et al. Integrated rapid mapping of neglected tropical diseases in three States of South Sudan: survey findings and treatment needs. PLoS One 2012;7:e52789.

3 Ndayishimiye O, Ortu G, Soares Magalhaes RJ et al. Control of neglected tropical diseases in Burundi: partnerships, achievements, challenges, and lessons learned after four years of programme implementation. PLoS Negl Trop Dis 2014;8:e2684.

4 Government of South Sudan - The Boma Health Initiative - A community anchored health system for sustainable health sector development. 2015. http://www.arkangelo.org/AAA/AAA%20documents/2016%20documents/Boma%20Health%20Initiave%20November%20version.pdf [accessed 5 June 2017].

5 Government of South Sudan - Education Statistics for the Republic of South Sudan. 2015. http://www.altaiconsulting.com/wp-content/uploads/2016/03/SSEMIS_2015_National.pdf [accessed 5 June 2017].