A History of Malaria Control in Uganda: The Limiting Effects of Political and Socio-Economic Inequality in Implementing Global Health Programs

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Abstract: *Objective:* To analyse the extent to which political and social-economic inequality have affected malaria control programs for prevention and treatment from 1950 to 2011 in Uganda.

Methods: My analysis is based on both ethnographic study findings over a one-year period with children who experienced war in northern Uganda in 2004-2005. The main objective of the research was to investigate children's illnesses and quests for therapy during a time of war. Additionally, I conducted a review of all policy documents and strategic plans by Uganda's Ministry of Health capturing experiences in implementing global and national health policies in malaria control.

Findings: Wartime children rarely engage in preventive measures, use cheap and affordable antimalarials, most of which have been scientifically proven to be ineffective. In addition the earlier 'war' on the malaria mosquito and the more recent recommendation of Artemisinin-based Combination Therapy (*e.g.* Coartem) as the first-line drug for uncomplicated malaria have been largely unsuccessful ventures, because malaria control requires programmes focusing on the social determinants of disease, such as poverty, since these factors hinder people's ability to practice recommended measures. Programmes aimed at the zoonoses, parasites, or vectors and pharmaceutical/technological aspects of control and management of malaria, like indoor residual spraying, using insecticide treated nets, spraying with DDT and use of Artemisinin-based Combination Therapies for uncomplicated malaria are short-term approaches which do not contribute to eradication, as frequently announced and promoted.

Conclusion: Socio-economic and political inequality are obstacles to effective malaria treatment and prevention programmes in Uganda and other resource-poor settings in sub-Saharan Africa.

Keywords: Malaria, Treatment, Prevention, Eradication, Social determinants of disease, Uganda.

HIGHLIGHTS

- Socioeconomic and political inequalities are obstacles for malaria control.
- Wartime children struggle to practice globally recommended malaria control measures.
- Effective malaria control will address social-determinants of disease.
- Resource-poor settings require access to affordable and efficacious antimalarials.

INTRODUCTION

Malaria is endemic in 95% of Uganda and the remaining 5% are epidemic prone areas in the highlands of South West and East [1-4]. There are an estimated 70-100,000 deaths per year among children under five years of age due to malaria, and between ten and twelve million clinical cases are treated in the public healthcare system [5, 6]. In part, the guidelines established by the WHO for malaria control(*i.e.*, for prevention and treatment) are difficult to implement by resource poor populations in settings like Uganda and yet these populations are the ones who bear the greatest brunt of malaria. The poor rarely engage in preventive and control measures, including case management with efficacious Artemisinin-based Combination Therapy (including Coartem), intermittent preventive treatment during pregnancy, vector control and epidemiology preventive preparedness responses [2, 3].The main obstacles are grounded in socio-economic and political inequalities, as well as strained healthcare systems in resource poor settings, that make it difficult for global policies to be meaningful in these contexts. Furthermore, because a substantial proportion of Uganda's population cannot easily afford Coartem, the country recently had to revisit its malaria policy, shifting in 2009 from exclusively recommending Coartem for first-line treatment to recommending Fansidar to high risk populations like pregnant women and children below five years of age [3].

As I analyse in this article, there is a stark divide between the recommendations of global health policies and the healthcare realities of local populations in socio-economically disadvantaged settings like rural

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and war-affected areas in Uganda. When members of these populations are ill with malaria-related fever, commonly their treatment consists of accessible and affordable antimalarial medicines such as chloroquine and Fansidar (sulfadoxine/pyrimethamine), despite the fact that studies have proven that there are malaria-resistant parasites that do not respond to these medicines [7]. For example, for the period 1999-2001, chloroquine treatment failures reached an average of 33% in Uganda [8] and the treatment failures of Fansidar therapy increased from 5.5% to 12% during the period 1995-1998.

In the next section, I will first present the methodology for the ethnographic research upon which this paper is based, followed by the findings regarding the history of malaria control in Uganda, covering a) prevention measures including prophylaxis, and b) treatment of malaria during the period from 1955-2011. In the same section, I also explore the disparities between national and/or global policy recommendations, on the one hand, and the treatment practices of resource poor persons, on the other. I aim to show how global health policies are reflected in past and present malaria control efforts in Uganda and how social and economic inequality influence malaria control efforts on the ground.

The article followed grounded theory [9] in analysis of data and conclusion that addressing socio determinants of disease will contribute to malaria eradication. Socio-economic differences imply differences in the extent to which the target population is able to engage in preventive measures for malaria and also purchase more efficacious but expensive antimalarials. Therefore, current globally accepted policies in malaria control may not be appropriate for resource poor contexts.

METHODOLOGY

In 2004-2005, a period when Coartem was frequently distributed to state-aided health centres through globally funded health programmes and Non-Governmental Organizations (NGOs), I conducted an ethnographic study in northern Uganda among children to investigate their illness experiences and their quests for therapy. During the conflict in northern Uganda, children were among the estimated 2 million people displaced by armed conflict from their homes and livelihoods.

Table 1: Socio-Demographic Characteristics of Ethnographic Sample (N=24)

Characteristics	Boys(n=10)	Girls(n=14)
Age range(years)	10-15	10-15
Average age(years)	13.8	13.4
Education(years)	3-7	4-6
Average Household size	4.9	4.5
Child headed-households	5	4
Caretakers of sick kin	1	3
Parents in camps	4	7

Children who participated in the ethnographic study met the criteria: were 8-16 years old, lived in child-headed households, attended a primary school for displaced children. At the time of the study, there were six displaced primary schools in Gulu Municipality and the scripts are a collection from all the schools because I recruited those who are willing to extensively share their experiences- whereby the entry point would be answering questions in the interview guide, or diagrammatically representing their illnesses. Some children were the caregivers for an HIV/ AIDS patients who were either registered in the Presidents' Emergency Plan for AIDS Relief (PEPFAR), at Lacor Hospital, or was a client of World Vision's Antiretroviral Programme. The first encounter with these children was also-at -a-displaced primary school.

Although it is difficult to conclusively say, how many children participated in all study methods, 24 children did participate in at least three techniques (see Table **2**).

Table 2: Child Participants in Ethnographic Research Methods (N=415)

Research Method	Study Participants	Cumulative Total
Writing compositions/stories	150	150
Interview with interview guide	165	315
Drawing of Illness	100	415
Focus group discussions	108	415
Workshops	24	415
In-depth interviews	24	415
Participant observation	24	415
Detailed narratives	24	415
Ethnographic sample	24	415

When administering semi-structured interview guides I wrote down the answers on behalf of some children, though older children wrote down the answers themselves. Interviews were conducted throughout the year in this region with *stable malaria transmission* whether in rainy or dry season. Only data from in-depth interviews and focus group discussions were recorded using a digital recorder. I transcribed children's compositions/handwritten stories and data from indepth interviews within 24hours of fieldwork. Whereas some children wrote their stories in English, all interviews were conducted in Acholi, the local language in northern Uganda. Elsewhere [10, 11], I have discussed how intersubjectivity and shared biographical experiences influenced the research process, informant selection, data analysis and reporting to the extent that the outcome reflects the particular interactions between researcher and researched. Furthermore, the researcher was guided by the Convention on the Rights of the Child, Save the Children and UNICEF child rights-based perspective [12] which sees children not as passive recipients of support but as active individuals who play an important role in their own development, relationships and protection.

Because some wartime children lived in child headed households, were caretakers of sick adult kin and/ or lived away from parents who resided in distant displaced camps, in their everyday lives they made independent decisions, including for their healthcare. They sometimes asked adults for guidance, or asked staff in the drug shops which medicines to buy for fever and malaria - but the child made the decision to go and buy medicine. That is what I call independent decision-making in healthcare. Socio-economic factors like inability to raise sufficient resources limited their choices, and I will present narratives where children bought under-dose, cheaper drugs - even when they obtained prescriptions from health centers to buy efficacious Coartem, they bought chloroquine instead. Adults too were affected by economic hardships, which limited their choices, nevertheless, they made independent healthcare decisions. Many children engaged in income generating activities like fetching water for sale, taking care of neighbours' children, small scale trade like salt, eggs, match boxes. Some Aid agencies provided food supplies, and MSF donated Coartem to state aided health centres, but they did not provide chloroquine because it had scientifically been proven ineffective. However, chloroquine was available in drug shops and pharmacies, and continues to be widely purchased.

I observed clients in the regional referral hospital outpatient clinic and its pharmacy over a one month period, to find out what medicines were prescribed for clinically diagnosed malaria. The same observation exercise was conducted in 2010 for a duration of two months in six drug shops within Gulu municipality, to find out which medicines clients frequently requested for their malaria episodes and in what amounts they purchased them.

During tri-monthly home visits with the 24participants in the ethnographic study, they were asked which antimalarial medicines they had used – if any – in the past month. As shown in the text, ethnographic findings during war are consistent with the everyday experiences of many resource poor persons in post-conflict Uganda regarding the extent to which they can practice globally recommended ideas about malaria prevention and control. In Gulu district, like all holoendemic rural districts in Uganda, the situation is more precarious in health centres since they no longer receive any donations of Coartem from emergency aid agencies.

For this article, secondary data covering Uganda's history of malaria control, as well as current strategies and challenges, were collected through a systematic review of 20 malaria control strategic plans, the demographic survey reports and health policy documents from the Ministry of Health between 1995 and 2011.

ETHICAL CONSIDERATIONS

This study was approved by the Uganda National Council for Science and Technology. In addition, permission was sought and granted from the Gulu District Health and Education Offices. Prior to interviewing school children, permission was sought from school teachers and their adult caretakers. For the observations in health centres and outpatients units, permission was obtained from the regional referral hospital administrator and drug shop owners to observe and verify the type and quality of antimalarial medicines they distributed to clients. All respondents who participated in this study were assured of confidentiality and anonymity. Names used in this study are therefore pseudonyms to protect the participants' identities.

MALARIA CONTROL IN UGANDA: HISTORICAL AND ETHNOGRAPHIC PERSPECTIVES

Information in this section is presented and analysed in two main parts covering prevention and treatment of malaria. The first part shows how

historical-political approaches in malaria control are significantly affected by the variations in socio-economic and political commitment and type of state leadership in Uganda. For instance, although there is some evidence that in the 1950s Uganda was making attempts to engage with the global agenda in malaria control [13, 14], during the dictatorial regime of the late Idi Amin in the early 1970s, there was a limited focus on and implementation of disease control programmes. During this latter period Uganda experienced major economic hardship, whereby its population was unable to access even basic daily needs, let alone practice recommended preventive measures. However, with increased political commitment since the mid-1980s [15], the state has embraced the global disease control agendas, including the Roll Back Malaria (RBM) programme. Nevertheless, contextual factors such as poverty, as well as the effects of war, including displacement of people from their homes and livelihoods in northern Uganda affects the extent to which malaria prevention programmes can be implemented [16].

In the subsequent part, ethnographic and secondary data obtained through review of malaria control strategic plans in Uganda [2, 3, 5] are presented concurrently. The main finding during the ethnographic study was that respondents rarely engaged in preventive measures, including the use of insecticide treated mosquito nets (ITNs) and weekly prophylaxis. In addition, they frequently used affordable chloroquine and Fansidar – antimalarials that have been proven to be ineffective due to the presence of malaria resistant strains of *Plasmodium falciparum* (one of the species of Plasmodium, the protozoan parasite that causes malaria in humans).

Furthermore, a chronological review of all policy documents about malaria control was conducted, starting with how the focus on the malaria vector – the female *Anopheles* mosquito – was adapted and implemented in Uganda in an attempt to eradicate malaria [13]. The discussion section problematises the global health agenda recommendations for proposed preventive measures, including use of insecticide treated nets, indoor residual spraying, and the use of efficacious Coartem as a first-line drug, among resource poor populations and health centres that in Uganda have been consistently poorly stocked with drugs and managed with minimal state budgets [16]. Furthermore, contextual national factors include the Ugandan government's infrequent distribution of nets to resource-poor persons– an activity heavily dependent on donor funding. When nets are distributed, they are often of poor quality and the beneficiaries rarely use them properly. In addition, weak referral systems, insufficient information about new drugs, inadequate manpower at district, health facility and community level to handle case loads, especially in epidemic situations, affect malaria control efforts [18].The main argument rests on the fact that even though being part of the global health agenda is important for Uganda, in terms of learning about the efficacy of antimalarials and how to effectively control malaria, social-economic and political factors and inequality present significant obstacles to achieving these goals.

Other factors include socio-cultural factors – *e.g*. as has shown for malaria control in neighbouring Tanzania, people prefer to use herbal medicine which is made from the non-synthetic, locally grown medicinal plant *Artemisia annua.* Further, [21], discuss "processes of localisation" implying that patients may have their own treatment priorities even in those states where they have access to broadly recommended therapies and/or preventive measures. In the following, however, I focus mainly on the socio-economic and political barriers to the successful implementation of malaria control programs in Uganda – while acknowledging at the same time that children living in conflict situations have their own, culturally shaped ideas regarding treatment of illness episodes, including the recurring self-medication with traditional medicine.

HISTORY OF MALARIA PREVENTION MEASURES IN UGANDA (1950-1998)

From the 1950s until the early 1990s, Uganda's efforts to control malaria with respect to prevention were narrowed to environmental management in some municipalities and towns; rural areas were left out[14]. The main focus was on the mosquito as the transmitter of the disease, and in line with the 1948 WHO strategy, malaria eradication efforts were linked to eradication of vectors. Within this approach, target municipalities constructed drainage channels (also called malaria channels) with the aim of reducing breeding sites for all mosquitoes. Water was drained out as a way to engage in the 'war on the mosquito' [13, 14].

During this same period, the WHO pioneered a malaria eradication programme through mass spraying with Dichloro-Diphenyl-Trichlororethane (DDT), synthesised by a Swiss company in the 1930s. When applied to the wall of a house, DDT can kill mosquitoes for months. Sprayed into a pond, mosquito larvae will die,

as will any adult mosquitoes [22, 23]. Indoor residual spraying of DDT was implemented on a large scale only as part of the WHO pilot programme between 1959 and 1963 in the southwest Kigezi and Masaka. While significant reductions in malaria transmission were achieved [14, 22], indoor residual spraying was never implemented or scaled up as a national programme because of lack of resources and the coincidence with the end of the global malaria eradication campaign through the 'war on the mosquito in the year 1970' [23].

The focus on vectors was also largely critiqued by social scientists, who proposed that effective control measures for malaria needed to focus on the social determinants of the spread of disease [24-26]. Malaria is the outcome of a complex relational exchange; it is textured by unpredictable proximities that disappear when malaria is scaled up to a global matter. Furthermore, adapted global health agendas in malaria control have had unintended consequences for Uganda's Ministry of Health(MOH); for instance, the immediate problem of eradication programmes is that they create false expectations, but additionally they lead governments to abandon more mundane, budget draining, but ultimately effective control policies [27].

In short, while malaria is an infectious disease, with known vectors and with known ways to eradicate them, malaria is also a socio-economic issue. People most affected by this easily preventable and treatable disease are the poor who occupy the lowest echelon of the socioeconomic spectrum. These people find it difficult to practice preventive measures such as weekly prophylaxis or spraying their residences with DDT. In addition, use of DDT has become contentious in the recent past, since environmentalists have argued that its constant use causes dangerous health problems such as cancer. A significant policy landmark in malaria control in Uganda occurred in 1995 when the Ministry of Health created a Malaria Control Programme [2, 3] to direct and guide prevention and treatment activities. The MOH/MCP monitored resistance levels in the parasite and prepared for treatment policy changes [2-5]. For instance, the MOH/MCP once again recommended indoor residual spraying with DDT, a practice which had been used only sporadically during epidemics, including when Uganda experienced floods in the eastern and central regions. This initiative was, however, only implemented on a small scale, guided by local initiatives mainly in the southwest, as well as in selected institutions including boarding schools and barracks. With mosquito nets used in very few areas of Uganda, mainly around Lake Kyoga, the introduction of ITNs started with small trials and projects in the early 1990s. First, district-based distribution/sales were carried out through non-governmental organisations (NGOs) and bilateral organisations (*e.g.*, African Medical and Research Foundation [AMREF] and German Technical Cooperation [Deutsche Gesellschaftfür Technische Zusammenarbeit – GTZ]), but these did not exceed several thousand nets per year.

CURRENT MALARIA PREVENTION EFFORTS (1998-2005)

As I will show below, there has been a gradual shift in approaches in malaria prevention to involving multi-pronged methods, because of failed past experiences. Although there is still advocacy for preventive measures, more complex forms are suggested, to include prophylaxis, indoor residual spraying, and use of ITNs. This era included the launch of Roll Back Malaria in 2007. The Roll Back Malaria Global Malaria Action Plan has five succinct but ambitious targets; indeed, the action plan revived mid-20th century dreams of living in a 'malaria free world' [28]:

Until 2010 universal coverage of interventions such as bed nets and malaria case management is to be achieved. Malaria cases are to be reduced by 50 per cent in 2010 and by 75 per cent in 2015; deaths are supposed to sink near zero by 2015. In 8-10 countries malaria is to be eliminated by 2015; and finally in the long-term the aim is to eradicate malaria worldwide.

With its main financing coming from philanthropic institutions, including the Bill and Melinda Gates Foundation (BMGF), the campaign takes Sub-Saharan Africa as its primary battleground. The approach of the BMGF has been criticised widely for its reliance on 'quick fix' solutions [27]; nevertheless, the speculative logic attendant to bioeconomy is integral to the revival of malaria eradication.

Since the early 2000s, the Malaria Control Programme has been based on the principles and aims of the global Roll Back Malaria movement, the Abuja Declaration by African Heads of State, and the Millennium Development Goals. The Ugandan Ministry of Health and its Malaria Control Programme works within this framework with line ministries, civil society, Non-governmental organisations, development partners and the private sector in order to achieve the set objectives and targets [30].

Some of the targets include to ensure universal access to Coartem and improved diagnosis, as well as severe malaria management; emphasis on treatment and prevention of malaria in pregnancy, integration of malaria control into a balanced health system development with emphasis on human resource development and strong management, evaluation and operational research to monitor progress, evaluate impact and continuously improve interventions [31, 32].

In line with the malaria control principles at that time, in the financial year 2000/2001 Uganda was one of the first countries to introduce a waiver of taxes and tariffs for ITNs. This helped in the rapid development of a commercial mosquito net and ITN sector, which has since shown exponential growth rates [33]. Prior to these initiatives in malaria control, the main approach was to treat clinical cases with chloroquine. In the recent past, [33] suggested that substantial results have been realised towards effective malaria control. For instance, knowledge of malaria, including its severity and the major risk groups, has steadily increased in the population and now generally reaches levels over 80%; the demand for preventive measures such as ITNs has also rapidly increased, along with the establishment of a viable commercial market for these products and distribution mechanisms through civil society and the public sector. This has resulted in an increase of the proportion of households with at least one mosquito net, from 13.2% to 25.9% [33]. Notably, the increase in mosquito net coverage in households was only made possible by philanthropic funds in malaria control. The sustainability of this approach is thus questionable since the beneficiaries largely depend on financing from Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) and BMGF, without whose assistance they cannot engage in these preventive measures. Furthermore, a follow-up assessment found misuse of the mosquito nets, *e.g*. as curtains, as well as non-use as recipients in northern Uganda argued that it made sleep uncomfortable in their already hot surroundings [34]. Marketing of mosquito nets has also met with difficulties including general poverty and failure by the rural population to prioritise this malaria-prevention technology as a way of minimising infections by *plasmodium falciparum.* In addition, using or not using bed nets is often ignored when most people assert that they get bitten before going to bed (at dusk, when people are mostly outside preparing or eating food).

I will now show how malaria treatment in Uganda is also affected by global health recommendations on one hand and the accessibility and affordability of antimalarials – as well as practices and priorities of individuals – on the ground, on the other.

TREATMENT VARIATIONS AND POLICY RECOMMENDATIONS (1986-DATE)

With the rapid recovery of the Ugandan economy after 1986, accompanied by state support for global health policies, access to medicines improved dramatically, not only through government and NGO-based health facilities but also and particularly through the private for-profit sector. In many areas, drugs obtained from drug-shops or private clinics became the principle source for malaria treatment, reaching between 60% and 83%, of all malaria drugs purchased depending on the trading infrastructure of the area [35]. The mid-1980s also coincided with global Structural Adjustment Programmes and liberalisation of the market economy, culminating in the easy availability of pharmaceuticals as commodities [15]. One of the unintended consequences of easy pharmaceutical access is over-use and abuse of medicines, leading to drug resistance to antimalarial drugs like chloroquine [36].

In effect, Uganda has benefitted significantly from embracing the global health agenda, including being able to access current information about the efficacy of malarial medicines such as Coartemand, knowledge about prevention, including the importance of ITNs, treatment, and drug resistance, such as *Plasmodium falciparum*'s resistance to chloroquine and the female *Anopheles* mosquito's resistance to DDT. For instance, [37] has suggested that in the age group one to fifty-nine months, about six lives in every thousand could be saved every year if regular and proper use of ITNs is guaranteed. Nevertheless, the effectiveness of ITNs is called into question in real life conditions, where social, cultural, and economic factors influence routine use and regular treatment.

However, after the store of donated Coartem was depleted, it emerged that a substantial proportion of people affected by malaria [36] could not afford the recommended first-line drug. In 2005, the officer in charge of the Malaria Control Programme was moved to a less prestigious Neglected Disease section for opposing the recommendation that Coartem be the first line drug because the general population would be unable to afford it.In addition, household studies on the average expenditure on malaria treatment (direct cost) in the mid-1990's found that it varied between US$

4.10 in urban and $ 1.80 in rural settings [5]. These costs are likely to have increased in view of increased parasite resistance to a number of anti-malarial drugs in the recent past. Concrete data is lacking, but with recommendation of Coartem as first line medicine for malaria, whose average cost is 10 times more than for chloroquine and Fansidar [36], an average estimate could vary between US $ 40.1 in urban and US $18.0 in rural areas if people were to manage their malaria as per the recommendations. The costs will be incurred by the clients since the state-aided health centres rarely have required medicines.

CHILDREN'S EXPERIENCE OF MALARIA TREATMENT DURING WARTIME

In this section, I present ethnographic research findings about the experiences of children obtaining malaria treatment during a period of war, as evidence that people living in war situations and in rural areas frequently resort to cheaper malaria medicines. The findings below suggest that chloroquine and Fansidar are the main pharmaceuticals used by many people living in poverty in rural Uganda who have limited access to health facilities, which tend to be located in urban areas.I therefore critique an underlying assumption that the people at risk ofmalaria will help to offset some of the running costs for policies in malaria control if they buy the expensive drugs [28].

During the ethnographic study in wartime northern Uganda, over four hundred school children wrote about, represented diagrammatically, or narrated their experiences with malaria within a one month recall period. Some of the recorded narratives are presented in the Table **3** below.

Furthermore, I present here the narratives of 'Okello, Acan and Achiro to show symptoms leading to self-diagnosis, experiential severity, and the differential

Table 3: A selection of Narratives Depicting Prevention and Treatment of Malaria

Preventive Measures for Malaria	Treatment Options for Malaria
We do not have mosquito nets at home. We only close windows early to reduce the number of mosquitoes entering the hut, but still when I go to bed I find the mosquitoes all over (14 year old boy, Interview in September 2005).	When I went to hospital, the doctor told me I had malaria. He wrote that i should buy Coartem to treat it. At the hop they wanted a lot of money, and I did not have it. The shop owner told me to buy chloroquine. I bought 4 tablets of choroquine at 100 shillings (15 year old girl, Interview in November 2005).
My mother is registered in a project for people with HIV/AIDS in World Vision. One day they gave her a mosquito net. She has been using it for a long time. Presently its torn, so all of us sleep on a mat without using a mosquito net(16 year old boy. FGD, November 2015).	Last month i had malaria. When I told our neighbour that I was feeling fever, headache and that I vomited everything I ate, she gave me some two tablets of chloroquine and one fansidar. She told me to swallow them with warm water. After two days I began feeling better (13 year old girl, Interview in December 2005).
When MSF distributed mosquito nets to orphans in the camp, we were given one. But my brother sold it, so that we can get money for food(16 year old girl, interview in November 2015).	The last time I had malaria, my grandmother bought for me 4 tablets of chloroquine and 2 fansidar. After taking the medicines, I vomited. My uncle later in the same evening bought for me 2 Panadol and 4 chloroquine. I took all the medicines. The next day I was not ok. I went to school but the teacher told me to go to hospital. At the hospital I was given one injection, and the nurse said it was quinine. She told me to go back the next day. I went back with my grandmother. I became ok after one week. (15 year old boy, Interview in December 2005).
Although we were taught at school about how to prevent malaria, no one is doing anything about it. My mother told me she has no money for buying a mosquito net(12 year old girl, FGD in November 2005).	As I write this composition, I have left my sister at home because she has malaria. Our neighbour gave her some bitter and white medicines, which she called chloroquine. She is improving, but is still too weak to go to school(15 year old boy, essay in November 2005).
We have a mosquito net, but we have not used it yet. MSF people told us to tie it at the roof of the hut and then spread it around the mat. But when we do that, it does not reach the floor (14 year old boy, interview and home visit in October 2005).	When my mother has malaria, she sends me to the World Vision clinic to bring for her some medicines. But sometimes, I find when they have none. So we can buy some chloroquine from the drug shop, or we can ask the man who has a shop to give us some medicine for malaria, then we pay him later (14 year old girl, Interview in November 2005).
At the World Vision, we were given a mosquito net. Only my uncle uses it since he is sickly and weak. Neighbours say he has HIV/AIDS(13 year old girl, interview in December 2005).	That week when my mother received a mosquito net from World Vision, the headmaster had sent me home for examination fees. Because my mother did not have money, she sold the net to our neighbour who has a shop in town. So she does not use a mosquito net, even when she tells the counsellor that she does so. But when she has malaria, she goes to the clinic and they give her medicines (15 year old girl, interview in December 2005).

quality and quantity of the medicines that children accessed malaria.

Fourteen year old Okello wrote the composition as follows

- As I write this story, I still have medicine at home for malaria. Just on Friday when I left school, I was feeling some headache and did not feel like eating anything. When my friends came for me to go and play, I told them I was not feeling well. At that time now, I was feeling very cold and my body was shaking. I asked a neighbour for some medicine for *koyo* and he gave some chloroquine and Panadol. By the time it was night, I was still feeling cold, and headache, so I told my brother to use some of the money I had got from selling sugarcane to go and buy Fansidar. In the shop, they also told him to buy more chloroquuine and Panadol. I swallowed two Fansidar and 2 Panadol. By morning I was feeling better, but my brother told me to continue taking medicine until they I finish them.

Furthermore, 13 year old Acan narrated her story in this way

- That Saturday when we were supposed to come for the workshop, I woke up feeling very weak. After brushing my teeth, I wanted to eat some food, but my mouth tasted bitter. After a few minutes I vomited. I was feeling headache and my body was hot. I asked Otim to go and ask his mother if he has some medicine for malaria. He came back with some chloroquine. The mother told him that I should drink it with warm water so that I do not vomit again. I took, three chloroquine that morning and the next day two tablets. That is how I became ok.

Furthermore, 14 year old Achiro narrated the following:

- When the term ended, I went to the camp in Pabbo to be with my parents. Just that week I felt sick. It started with headache and I was feeling weak. I vomited everything my mother gave me to eat or drink. She my mother touched my chest, she said I had *lyeto* (fever). She went and bought chloroquine and Panadol. I first took 3 tablets of chloroquine and two of Panadol. The next day she gave me two chloroquine and one Panadol, but I was not feeling ok. She went and bought 3 Fansidar which she gave me in the evening. Before I went to slept, she also gave me some herbal medicine (*yatAcholi*) for headache and chest pain. The next day I woke up feeling a bit better.

One key finding in the foregoing narratives is that children self-medicated or only bought medicines for malaria episodes with sub-clinical doses without prior consultation with any professional healthcare giver. This is in line with evidence that self-medication is usually the first choice for most people in rural and urban parts all over the world [38, 40].

Furthermore, whereas at the time of this study there were major policy revisions underway in malaria control – in the form of a shift from the previous recommendation that children of school age take chloroquine to recommending Coartem as a first-line drug – the children in the study indicated buying chloroquine and Fansidar for their malaria-related fever. Despite the recommended treatment regime – which states that school age children should take four tablets of chloroquine on the first day of diagnosis, and subsequently two tablets on the second and third day of treatment (*i.e*., a regimen of 4:2:2,) – findings suggest that children only took medicines at below the recommended doses. The foregoing is common in malaria treatment where dosages are stopped as soon as symptoms disappearor poorly stored and expired drugs are taken from former malaria episodes. Some easily accessed drugs are fake antimalarials [39]. Another issue from the narrative is sharing of medicine, which could have been poorly stored or stored beyond the expiry date. Children also took under-dosages for their malaria episodes and claimed to have recovered.

Chloroquine causes itching in some people, but this could be avoided by taking Piriton or other antihistamines -no child discussed having done so. Neither were such additional tablets given to people who exhibited allergic reactions to the free antimalarials provided in state aided hospitals. An alternative would be to take other types of antimalarials such as Fansidar, quinine, Artenam, and Coartem, but these are often more expensive than chloroquine, and therefore few children could afford them [16].

Even at the time of writing this paper, many people living in northern Uganda were seen asking forchloroquine and/or Fansidar for malaria-related symptoms like fever, vomiting, and headache in clinics and drugshops. These drugs are always given in quantities that they can afford. In a one day observation exercise in June 2010 in a drug shop

located near Gulu Regional Referral Hospital, eight of eleven patients, after consulting in the outpatient unit and being told there was no Coartem in the hospital's pharmacy, bought chloroquine, Fansidar, and paracetamol syrups instead, which were more affordable. One mother discussed her drug choice as follows, following enquiry as to why she preferred to buy chloroquine and not the prescribed Coartem:

- Chloroquine also works well for malaria. For me I have ever used Coartem only once when I was given for free in the hospital. On another occasion when I asked for it in this drug shop, I found the price was too high. From that day, I only ask for either chloroquine or Fansidar if I have malaria.

During the researcher's fieldwork, many children also wrote about their experiences with malaria which they treated with Chrolorquine and Panadol. For example, 14-year old Okello wrote:

- I had malaria last week because of any mosquitoes in the night commuters' shelter. I knew it was malaria because I had headache, dizziness, coldness and I wanted to be under the sun all the time. I went to the drug store near home and I bought Chroloquine and Panadol for one hundred Shillings each.

Furthermore, one 14 year old boy wrote about the lack of medicines in the hospitals as follows:

- When I had malaria, I bought Panadol and Fansidar from a shop near home. I first went to the hospital alone but I found that the medicines were finished. I went to another hospital but they were asking for a lot of money. Idid not have a lot of money.

CURRENT MALARIA CONTROL CHALLENGES

At the national level, Uganda's malaria control programme is faced with two main challenges, including the vulnerability of war-affected persons and the general poverty of its rural populations. Malaria poses an additional burden for war-affected populations, especially in north and south-western Uganda, because of the poor living conditions in displaced persons' camps. In 2004, a household survey in northern Uganda reported up to five times more malaria-related deaths among war-affected people [41].

It should be noted that Uganda's malaria control programme improved significantly between 2000 and 2005 with a grant from the GFATM. The main contributor to this fund is the Bill and Melinda Gates Foundation. For example, a fund of fifty-five million USD was invested in malaria control in 2001, and a higher amount of seventy-three million dollars was invested in this activity in 2005. The UDHS [33] reported that control of malaria was at its highest during this period, which also coincides with an adoption of a policy recommending a relatively expensive regimen of Coartem as the first-line drug for uncomplicated malaria.

The funds from philanthropists were mostly meant for improving technological aspects in malaria control, and there was limited focus on the social and economic determinants of the disease. The Global Fund money was meant primarily for indoor residual spraying, distribution of free ITNs, and the provision of microscopes for quality laboratory diagnosis of malaria. In addition, in 2004, due to the availability of these funds, in order to enable broad access to Artemisinin-based Combination Therapy also in the private for-profit sector, artesunate-amodiaquine(trade name Coarsucam)was defined as an alternative first-line treatment [42].

Nevertheless, the major challenge is how to make Artemisinin-based Combination Therapy available not only through the public sector but also through the many for-profit outlets that serve as a major source of malaria treatment. For-profit outlets, especially in rural areas, rarely stock Coartem because clients cannot afford it. Furthermore, whereas clinicians have been trained about the importance of prescribing Coartem because of its efficacy, and they do so; they are aware, since clients discuss it with them, that they will buy the cheaper antimalarial drugs instead, including chloroquine, which is readily available in drug shops and grocery shops where medicines are sold.

The aim to equip all health centres with sufficiently trained laboratory personnel, equipment, and supplies has also met with many challenges including limited staff to confirm tests in the laboratory and insufficient/absent supervision and quality control of laboratory services. For example, while the proportion of health facilities with functional microscopy services has increased over the years, still only eight per cent of all cases reported in the health management system in 2004 were laboratory confirmed, due to limited staff in health centres. In particular, regular supervision and quality control of laboratory services in the public as well as in the private sector are still insufficient or absent.In the MOH/MCSP [30] it was noted that:

Experience also showed that the original plans of carrying out net[mosquito] treatment twice a year was not achievable with the existing human and financial resources and that a campaign once a year is more realistic. Furthermore, large scale application of indoor residual spraying in at least 2 of the epidemic prone districts was envisaged for 2004 funded through the GFATM grant but did not happen due to the delays in procurement.

Generally speaking, Uganda's national malaria control programmers have emphasised curative measures. In part, this is because over the last decade Uganda has been overwhelmed with policy changes and research to prove the efficacy of new antimalarials. Each research has led to a recommendation of drugs other than chloroquine, quinine, and a combination of Fansidar and chloroquine. The most controversial policy recommendation was the use of Coartem as the first-line drug in such a resource-poor setting, though this was done with some recognition that high risk groups for malaria, including pregnant women and children under five years, would continue to be recommended affordable and available regimens of Fansidar [43].

Furthermore, the innovative solutions sought by the Bill and Melinda Gates Foundation are a matter of transfer: technologies invented in one place are retooled and relocated to improve life elsewhere. Indeed, for a while the Uganda Malaria Control Programme was funded by the Bill and Melinda Gates Foundation, but the foundation lost interest when it moved from trialling to sustaining the project.This abandonment reflects a tension between the innovative possibilities of (short-term) aggressive and targeted transnational funding and the (rather long-term) ecological and socio-political dimensions of disease [44].

COPING WITH CHALLENGES THROUGH RECOMMENDING HOME BASED THERAPY

In order to complement the (occasionally) available free malaria treatment through public health facilities and bring it closer to home, a relatively affordable programme of home-based management of malaria fever for high-risk groups, including children under-five years of age, was introduced in ten districts in 2002. The drug was initially distributed directly to districts by the national Malaria Control Programme, but delivery was later integrated into the existing essential medicines supply system. Caretakers of children with fever access the treatment through volunteers called community medicine distributors, of which two are selected and trained per village. These community medicine distributors report to and receive supplies from the nearest health facility, which is also responsible for the supervision. Between 2003 and early 2005, this programme had gradually been rolled out countrywide, including amongst the most vulnerable populations and contexts, such as people living with HIV/AIDS and those in post-conflict settings. People affected by war were regarded as a more vulnerable group, because their poor socio-economic condition and the fact that they live in camps, coupled with a high prevalence of malaria, leads to the deaths of a large number of children [30].

Regarding home-based management of fever using Artemisinin-based Combination Therapy, there is a particular challenge in introducing the new drug (Coartem), since it involves regulatory issues including drug handling and safety, appropriateness, and the feasibility of restricting treatment to parasite-positive cases by introducing rapid diagnostic tests [30, 45].

This paper's main argument is that although Uganda's involvement in global health agenda offers both opportunities and challenges in malaria control, often, without the resources for the poorest of the population to take advantage of the recommendations of the global health policies, the policies face socio-economic and political obstacles in implementation. This will necessarily continue to be the case until there are significant budgetary commitments to support these health policies (for a similar case of limited supplies of antiretroviral drugs in the context of global health programs on AIDS treatment in Uganda [46].

The Ministry of Health has progressed from exclusively preventive approaches, to prevention and prophylaxis in malaria control, to a policy focus on therapeutic approaches involving a recommendation of a relatively expensive regimen of Coartem as a first line drug. I have no doubt that Coartem is efficacious for uncomplicated episodes of malaria; however, the population most at risk does not use it because of its high price. Furthermore, its launch as the first-line treatment choice must also be considered in the context of global pharmaceutical market interests. Finally, Uganda's dependency on global funds has served to both distract it from implementing more sustainable and effective approaches to malaria control, and to a dopt more expensive technology-based approaches which it cannot sustain without

philanthropic financing.

CONCLUSION

In sum, because of socio-economic inequality and widespread poverty, most of the malaria control strategies in Uganda have met with challenges, and some control measures were difficult to implement both for the Ministry of Health and people in low income settings. Whereas adopting the global Roll Back Malaria agenda must be interpreted in view of existing power relations and the need to promote a unified health agenda, as proposed by the WHO, these programmes and policies are difficult to implement in resource poor settings such as Uganda. Uganda has also embedded its Malaria Control Programme in a broader five year Health Sector Strategic Plan, which is part of the Poverty Eradication Action Plan, where malaria features as a high priority health and poverty issue [30]. As a consequence, there is a lack in Uganda of mechanisms and budgets to follow through on global health policies to the implementation level, with no commitment to promote health for all. Malaria control is a case in point.

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