



Review

Narrative review of current context of malaria and management strategies in Uganda (Part I)

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ABSTRACT

In accordance with international targets, the Uganda National Malaria Control Strategic Plan established specific targets to be achieved by 2010. For children under five, this included increasing the number of children sleeping under mosquito nets and those receiving a first-line antimalarial to 85%, and decreasing case fatality to 2%. This narrative review offers contextual information relevant to malaria management in Uganda since the advent of artemisinin combination therapy (ACT) as first-line antimalarial treatment in 2004. A comprehensive search using key words and phrases was conducted using the web search engines Google and Google Scholar, as well as the databases of PubMed, ERIC, EMBASE, CINAHL, OvidSP (MEDLINE), PSYC Info, Springer Link, Cochrane Central Register of Controlled Trials (CENTRAL), and Cochrane Database of Systematic Reviews were searched. A total of 147 relevant international and Ugandan literature sources meeting the inclusion criteria were included. This review provides an insightful understanding on six topic areas: global and local priorities, malarial pathology, disease burden, malaria control, treatment guidelines for uncomplicated malaria, and role of the health system in accessing anti-malarial medicines. *Plasmodium falciparum* remains the most common cause of malaria in Uganda, with children under five being most vulnerable due to their underdeveloped immunity. While international efforts to scale up malaria control measures have resulted in considerable decline in malaria incidence and mortality in several regions of sub-Saharan Africa, this benefit has yet to be substantiated for Uganda. At the local level, key initiatives have included implementation of a new antimalarial drug policy in 2004 and strengthening of government health systems and programs. Examples of such programs include removal of user fees, training of frontline health workers, providing free ACT from government systems and subsidized ACT from licensed private outlets, and introduction of the integrated community case management program to bring diagnostics and treatment for malaria, pneumonia and diarrhea closer to the community. However despite notable efforts, Uganda is far from achieving its 2010 targets. Several challenges in the delivery of care and treatment remain, with those most vulnerable and living in rural settings remaining at greatest risk from malaria morbidity and mortality.

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Abbreviations: ACTs, artemisinin combination therapies; AL, artemether–lumefantrine; AMFm, Affordable Medicines Facility – malaria; ART, artemisinin; AS–AQ, artesunate–amodiaquine; AS–MQ, artesunate–mefloquine; AS–PYR, artesunate–pyronaridine; AS–SP, artesunate + sulfadoxine/pyrimethamine; CAPSS, Consortium for ACT Private Sector Subsidy; CHWs, community health workers; CQ, chloroquine; CQ+SP, chloroquine + sulfadoxine/pyrimethamine; DDT, dichlorodiphenyltrichloroethane; DHA–PPQ, dihydroartemisinin–piperaquine; EIR, entomological inoculation rate; GDP, gross domestic product; GMAP, Global Malaria Action Plan; HBMF, Home-Based Management of Fever; HMIS, Health Management Information System; iCCM, integrated community case management; IRS, insecticide residual spraying; ITNs, insecticide treated nets; LLINs, long lasting insecticide nets; *P.*, *Plasmodium*; *P. falciparum*, *Plasmodium falciparum*; PMI, President's Malaria Initiative; QAACT, quality-assured ACTs; RDTs, rapid diagnostic tests; SSA, Sub-Saharan Africa; SP, sulfadoxine/pyrimethamine; UDHS, Uganda Demographic and Health Survey; UMIS, Uganda Malaria Indicator Survey; WHO, World Health Organization.

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1. Introduction

The World Health Organization (WHO) proposes that the best strategy to manage uncomplicated malaria in young children is to initiate prompt and effective antimalarial treatment within 24 h of the onset of fever and, where accessible, after confirmation by microscopy or rapid diagnostic tests (RDTs) (World Health Organization (WHO), 2010). Presently, artemisinin combination therapies (ACTs) are the recommended treatments for uncomplicated *Plasmodium falciparum* (*P. falciparum*) malaria (World Health Organization (WHO), 2010). In response, many countries have realigned their national policies and introduced management strategies to improve prompt access to malaria diagnosis and treatment. While such efforts have substantially improved management, for several countries across sub-Saharan Africa (SSA) these have not been sufficient to meet the global target of universal access to ACTs and diagnostic testing (ACTwatch Group, 2013a; Bastiaens et al., 2014). Household survey data from ACTwatch 2009 and 2012 report the usage of ACT in children under five with fever to have increased from 3–21% in 2009 to 8–44% in 2012 in six African countries: Uganda, Nigeria, Zambia, Democratic Republic of the Congo, Benin, and Madagascar (ACTwatch Group, 2013a). Similarly, the percentage of children who received ACT promptly also increased from 3.0–19.5% in 2009 to 7.0–35.6% in 2012. While a larger proportion (44.2%) of children in Uganda received an ACT in 2012 than in the other five African countries, less than a fifth (17.8%) received a confirmatory diagnosis for malaria (ACTwatch Group, 2013a). Furthermore, since not all caregivers seek treatment for their febrile children at public or private outlets, the actual proportion of all children with malaria who receive an ACT may be lower (United States Agency for International Development (USAID), 2009a). Analysis of 26 household surveys conducted in nine African Region countries between 2010 and 2012 using a positive rapid diagnostic tests among febrile children as a proxy for confirmed malaria, reported receipt of ACT to range from 1% to 42% with a mean of 16% (World Health Organization (WHO), 2013).

Confounding children's health is an obvious reliance on caregivers to seek out appropriate care on their behalf – a decision-making process that is complex and influenced by a host of factors (Arrow et al., 2004; Baume et al., 2000; Cohen et al., 2015; Colvin et al., 2013; Hausmann-Muela et al., 2002, 2003; Kizito et al., 2012; Maslove et al., 2009; McCombie, 1996; Njama et al., 2003; Nsungwa-Sabiiti et al., 2004; Rutebemberwa et al., 2009a; Williams and Jones, 2004). Examples of factors internal to caregivers include

their knowledge about malaria, their ability to recognize and correctly interpret its symptoms, their perception of severity, their cultural and local beliefs about health and ill-health, their decision-making structures, their access to funds and transportation, and their past experiences. When caregivers finally decide to seek external treatment for what they presume to be malaria, what actually happens depends on both the demand side – what people want, and the supply side – what is available to them (Arrow et al., 2004). With the latter commonly influenced by a nation's economic and political stability, health policies and infrastructure, and environmental realities (McKenzie et al., 2009). Furthermore, in SSA where drug shortages within public health facilities are common occurrences, this decision-making process is more challenging than parallel decisions in North America where there would be no question whether a clinic or hospital actually has the drug on hand to treat the disease (Arrow et al., 2004). Consequently, caregivers often delay decisions to seek external care while they weigh options, gather funds, and make arrangements. Thus, initially relying on home remedies and self-medication, reportedly convenient and cheap, as the initial first-step in the treatment of malaria. Unfortunately in the case of children, waiting can have severe and irreversible consequences which can occur very quickly. It is not uncommon for a child to have mild fever on day one, only to develop serious complications the next day and die.

Successful intervention strategies to optimize malaria care among young children require an understanding of factors influencing caregivers' treatment-seeking behaviors and an appreciation of the communities in which they live (McKenzie et al., 2009). Various reviews have documented treatment-seeking behavior for malaria in SSA, but none have focused exclusively on Uganda (Arrow et al., 2004; Colvin et al., 2013; Kizito et al., 2012; Maslove et al., 2009; McCombie, 1996; Okafor and Amzat, 2007; Smith et al., 2009; Williams and Jones, 2004; Winstanley et al., 2004). While countries within SSA share similar socioeconomic realities and public health infrastructure challenges, they differ with respect to political, religious, tribal, cultural, and local influences. These differences may in turn translate into different predisposing, enabling, and reinforcing factors that do not lend to generalizability of study results from one country to another (McKenzie et al., 2009).

Accordingly, a two-part literature review is undertaken: (Part I) a narrative review of the literature provides contextual information relevant to malaria management in Uganda, and (Part II) a systematic review of the literature on caregivers' treatment-seeking

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