Key Results from MAMaZ Against Malaria – A Pilot Project Focused on Increasing Rural Communities' Access to Rectal Artesunate

MAMaZ Against Malaria

TECHNICAL BRIEF

According to Zambia's national Health Management Information System (HMIS), a reported 1,851 Zambians died of malaria in 2016. Many other malaria deaths occur at community level and go unrecorded. Reported malaria cases increased between 2015-2016. If Zambia is to achieve the global target of a 40% reduction in malaria incidence by 2020, a priority focus on areas of highest mortality, including severe malaria in young children, will be important.[1][2]

Rural communities in Zambia face enormous challenges in accessing health care. As a result, a large proportion of severe malaria illnesses and deaths occur out of sight of the formal health sector. Working in partnership with the Zambian government and Medicines for Malaria Venture, MAMaZ Against Malaria tested the feasibility of a pre-referral intervention - rectal artesunate (RAS) - for young children suffering from severe malaria in hard-to-reach community settings. Building on the work of the Mobilising Access to Maternal Health Services in Zambia project (MAMaZ) and the follow-on project, MORE MAMaZ, the pilot was designed to address the wide range of household and community barriers and delays that prevented children with severe malaria receiving timely healthcare.[3] It also intervened to address physical access barriers and improve severe malaria case management in rural health facilities. The project successfully demonstrated the potential to increase hard-to-reach communities' timely access to severe malaria treatment.

Summary

- MAMaZ Against Malaria worked with Zambia's government to test the feasibility of introducing a pre-referral intervention for children with severe malaria in a community setting.
- Rectal artesunate (quality assured RAS 100mg) has considerable potential to reduce severe malaria mortality among hard-to-reach populations, but is not yet available for national use.
- The project increased the access of rural intervention communities to timely, quality severe malaria care, and was associated with a reduction in the severe malaria case fatality rate among young children reported by intervention health facilities. Severe malaria case fatality reduced by 96%.
- There are plans to roll out RAS across the country in future. Important lessons from the pilot in Serenje could usefully inform the scale-up process.

[1] World Health Organisation, 2015, Global Technical Strategy for Malaria 2016-2030.
[2] WHO, 2014, 'Severe Malaria', Tropical Medicine and International Health, Vol 19 (suppl 1).
[3] MAMaZ (2010-13) was funded by the UK Department for International Development, and MORE MAMaZ (2014-16) was funded by Comic Relief.

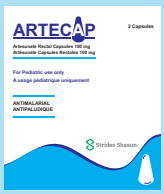
Background and Context

An estimated 70% of the world's burden of severe and fatal malaria falls on young children.[4] Severe malaria can be recognised in children at community level by observing danger signs (i.e. fever plus one or more of the following: inability to eat or drink, repeated vomiting, convulsions, unusually sleepy or unconsciousness). In practice, many cases are missed. A 2011 study in Zambia found that less than half of severe malaria cases in children under five years old reached a health facility.[5] Many barriers and delays at household and community levels affect recognition of severe malaria danger signs and prompt uptake of malaria services.

The case fatality rate among severe malaria patients who fail to reach a health facility is estimated as high as 90%.[6]

Access to quality drugs and effective case management of severe malaria are also common challenges. Randomised controlled trials have shown that RAS reduces the risk of death and neurological disability in children aged six months to six years old who show signs of severe malaria and have limited access to treatment. [7] However, although WHO Guidelines for the Treatment of Malaria have recommended the use of RAS for over ten years, it was not until December 2016 that time-limited approval for RAS was secured from the Global Fund.

Children who are given RAS at community level need to be transferred without delay to a health facility where they can be given a course of injectable artesunate. Various drug trials have proven the life-saving efficacy of injectable artesunate in the context of *P. falciparum* malaria compared to other drug options and the fact that it has fewer and less severe side-effects than alternative treatments.[8] When the project started RAS was not yet available in Zambia, and injectable artesunate was not available below District Hospital level.



Strategy

MMV initiated the project with a request for information to address the access challenge of developing an innovative approach to increase rural access to commodities for the treatment and case management of severe malaria. MAMaZ Against Malaria was established in July 2017 as a 12-month pilot to test the feasibility of increasing communities' access to severe malaria case management through the introduction of RAS in hard-to-reach settings. The project was implemented in Serenje District, Central Province, in partnership with the District Health Management Team (DHMT) and Zambia's National Malaria Elimination Centre (NMEC).

The project approach was developed to address the locally-specific factors at household and community level that were preventing prompt recognition of severe malaria danger signs, prompt referral for treatment, and adherence to treatment. An evidence-based community engagement approach, tried and tested by two earlier projects, MAMaZ and MORE MAMaZ, was adapted to include childhood illness. Communities were mobilised around a severe malaria and broader child health agenda by 477 trained Community Health Volunteers (CHVs). The approach empowered communities to take action in response to severe malaria and other life-threatening health conditions affecting young children. A 'whole community engagement approach' aimed to reach entire families and all parts of the community, including the vulnerable and excluded, who often carry the highest burden of ill-health.

MAMaZ Against Malaria Scope

Project district:
Serenje, Central Province

Project intervention communities: *45*

Intervention health facilities: *8*

Population reached: *54,000*

Communities that had already adopted a community-managed emergency transport system (ETS) based on bicycle ambulances were trained to support child health emergencies. ETS was also newly established in a small number of sites. Health providers in intervention health facilities were trained in severe malaria case management and to support the activities of CHVs. The project encouraged and supported the DHMT to lead and institutionalise the intervention to ensure sustainability.

[4] World malaria report 2017. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO.

[5] Mudenda S.S., Kamocha S, Mswia R, et al, 2011, 'Feasibility of using a World Health Organization-standard methodology for Sample Vital Registration with Verbal Autopsy (SAVVY) to report leading causes of death in Zambia: results of a pilot in four provinces, 2010'. Population Health Metrics 9, 40.

[6] Thwing J., Eisele T.P. and Steketee, R.W., 2011, 'Protective efficacy of malaria case management and intermittent preventive treatment for preventing malaria mortality in children: a systematic review for the Lives Saved Tool', BMC Public Health, 11, (Suppl 3), S14.

[7] Gomes, M., et al, 2008, 'Rectal artemisinins for malaria: a review of efficacy and safety from individual patient data in clinical studies', BMC Infectious Diseases, 8:39. doi: 10.1186/1471-2334-8-39.

[8] See: Sinclair, D., et al, 'Artesunate versus quinine for treating severe malaria', Cochrane Database Syst Rev. 2012;6:CD005967. [PubMed]; Dondorp, A.M., et al 2010, 'Artesunate versus quinine in the treatment of severe falciparum malaria in African children (AQUAMAT): an open-label, randomised trial', Lancet 376:1647–1657. doi: 10.1016/S0140-6736(10)61924-1.

Project Approach

- RAS was procured by the project for use in intervention sites. NMEC ensured that the district had an un-interrupted supply of severe malaria drugs and commodities.
- A training in severe malaria case management was provided to health providers in intervention health facilities.
- A community engagement approach facilitated by trained CHVs mobilised intervention communities around a severe malaria and broader child health agenda.
- Community systems provided safety nets for families with sick children. These addressed barriers of access, affordability and lack of social support, and included emergency transport, savings schemes, and food banks.
- A community monitoring system operated by CHVs generated data on severe malaria patients and other children supported by the project.
- A partnership approach with the DHMT and NMEC helped ensure that key activities were led and supported by government, helping pave the way for future scale-up.

The project supported the Zambian Government to prepare for the future roll-out of community RAS by encouraging visits by national and provincial policy makers to the project intervention sites, participating in the national Malaria Technical Working Group to share learning, and disseminating the project's approach and results at conferences and other events.

Results

Changes in the pilot project intervention sites were measured via:

- Baseline and endline surveys conducted in July 2017 and May 2018 respectively.
- A Community Monitoring System managed by trained CHVs.
- Monthly assessment and review of HMIS and other data in intervention health facilities.

These data sources confirmed that MAMaZ Against Malaria had successfully demonstrated the potential to reduce severe malaria deaths among rural populations located a long distance from the nearest health facility. The project led to:

- **A reduction in expected deaths of young children with severe malaria at health facilities from 8% at baseline to 0.25% at endline.**
- Substantially improved knowledge of severe malaria danger signs among CHVs: for example, CHVs who knew 'not being able to eat or drink' as a danger sign increased from 29% at baseline to 86% at endline.
- Demand for RAS from intervention communities: 1,215 suspected severe malaria cases were identified by CHVs and given RAS.
- 100% referral rate from home to health facility for children with suspected severe malaria.
- High follow-up rate of RAS beneficiaries: 94% of CHVs followed up children who had been given RAS on their return from the health facility.
- High demand for emergency transport in intervention communities, with 71% of suspected severe malaria cases supported by ETS in areas with bicycle ambulances.
- High demand for support from community emergency savings schemes, with 42% of all suspected severe malaria cases in intervention site supported by this system.
- Improved knowledge of other life-threating childhood illnesses: for example, knowledge of bloody stool as a severe diarrhoea danger sign increased from 21% to 77%.

"We had one month where ten children died from severe malaria. But since MAMaZ Against Malaria started working here, not a single child has died, and the community are aware of the danger signs of severe malaria."

Josephine Mupeta, CHV and ETS rider, Chief Serenje (personal perspective from CHV in one project intervention community)

The data also showed significant effects on the activities, confidence and motivation of CHVs.

Endline survey results - Community Health Volunteers

Indicator	Baseline	Endline
CHVs who managed a case of malaria in the last year	66%	**97%**
CHVs who knew at least three severe malaria danger signs	50%	**85%**
CHVs who referred children with suspected malaria to a health facility	66%	**99%**
CHVs who said they were confident to administer RAS	N/A	**98%**
CHVs who intend to continue volunteering 'forever'	N/A	**71%**

Use of a cascade training approach helped ensure that the project was cost-effective. The cost of training, equipping and supervising a single community RAS volunteer was K1,000 (USD 100). The cost per community (average population, 3,000) of training 14 CHVs and providing ETS (bicycle ambulance and rider training and equipment) was K21,000 (USD 2,095).

The project's supply-side component, which focused on improving health workers' skills in severe malaria case management, and ensuring a reliable supply of severe malaria drugs and commodities in rural health facilities, contributed to the reduction in reported severe malaria deaths in the project's intervention sites. All of the 32 health providers trained during the project managed at least one case of severe malaria over the project timeframe. However, an internal review found that a few health providers lacked confidence to administer injectable artesunate intravenously, preferring instead to administer it via the slower-acting intramuscular route. A refresher training is planned to ensure that all health providers are confident to administer artesunate intravenously.

A self-assessment tool was used to measure the extent to which project activities had become institutionalised into the day-to-day activities of the district. This identified a high level of local ownership and leadership of project activities. Members of the district health team were trained as core community RAS trainers, helping to ensure that training capacity remains within the district. The DHMT has taken steps to ensure that key project activities are monitored during the routine performance assessment process. Health facilities devised various ways in which they could support and supervise CHVs and ETS riders on an on-going basis, including through under-five outreach sessions.

Lessons Learned

Key lessons learned include:

- The project was implemented in areas where there were large numbers of highly motivated and well-trained maternal health volunteers (Safe Motherhood Action Group volunteers - SMAGs). SMAGs were trained alongside integrated community case management of malaria (i-CCM) volunteers and proved just as effective as the latter at identifying and managing severe malaria cases.
- The project trained up to 14 CHVs per intervention site. The large number of CHVs not only helped increase coverage of the project activities, but also created a network of volunteers who could support each other. This was positive for CHV motivation and for sustainability.
- 'Whole community' approaches are needed to change social norms in favour of improved child health care seeking. A whole community response cannot be achieved in situations where only one or two CHVs are trained per community.
- In the project's hard-to-reach intervention sites the average distance to the health facility was just under 14 kilometres. Community-managed emergency transport systems can significantly reduce travel times to the health facility, and be a positive factor in encouraging prompt referral of very sick children.
- Increasing demand for severe malaria services is only fully effective when a comparable improvement in the supply-side occurs. A reliable supply of drugs and consumables, and well-trained health providers were significant factors in encouraging use of severe malaria services. Health facilities also need to be accessible at all times.

Policy Implications

- NMEC is planning to roll out RAS across the country in the future. The government should consider adopting the approach used by MAMaZ Against Malaria where a variety of CHVs (SMAGs and i-CCM volunteers) were successfully trained in community case management of malaria. This builds on existing structures, increases community coverage, promotes equity of access to severe malaria services, helps to sustain the work of the volunteers, and is cost-effective.
- MAMaZ Against Malaria's evidence-based RAS training approach can easily be adapted for inclusion in national CHV training manuals, including those for i-CCM and SMAG volunteers.
- As quality assured RAS is rolled out across Zambia, it will be important to ensure an uninterrupted supply of injectable artesunate and malaria commodities (such as rapid diagnostic tests and disposal gloves) at rural health facilities.
- Community-managed bicycle ambulances help to reduce journey times to the health facility, and offer patients and their carers a comfortable and convenient means to travel. Bicycle ambulances can be successfully managed and maintained at community level. Districts are advised to budget for replacement vehicles after four or five years and to find a way to support ETS riders via routine supervisory processes.

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