A Prospective Cohort Study of Malawian Children Presenting with Fever

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Background

In 2010, the World Health Organisation revised its fever treatment guidelines to recommend antimalarial treatment only for those with a positive malaria test result, either at point-of-care testing or on microscopy. Oral artemisinin-based combination treatments (ACTs) are now available free of charge in Malawi, and long-lasting insecticidal nets had been distributed to all age groups by 2010. Despite this, and despite global gains in the fight against malaria, the WHO World Malaria Report 2018 estimated that there were 4.3 million cases of malaria in Malawi in 2017, with the majority of the 7,077 malaria-related deaths occurring in children[1].

Differentiating causes of childhood fever in rural clinics is challenging. *Malungo* is a term used in Malawi to refer to malaria and fever interchangeably, illustrating the challenge of differentiating causes of fever in this setting. Greater understanding of clinical features that differentiate malaria from other causes of fever may improve triage of febrile children in these settings. Furthermore, data with regard to healthcare-seeking behaviour and patient/guardian perspective on fever in this setting are lacking.

Aims

This prospective cohort study aimed to analyse clinical features associated with malaria and parental perceptions on causation of fever in a rural clinic in Malawi. Our data is intended to inform the approach to triage and malaria rapid diagnostic testing (MRDT) in rural clinics in Malawi.

Methods

This study included 313 children presenting with fever to a charity-funded clinic in rural Malawi between the months of March and June 2019. Children underwent tympanic temperature measurement and malaria rapid diagnostic testing (MRDT). Blood films were not routinely performed. Clinical assessment was performed, and brief interviews conducted with the child's parent or guardian.

Inclusion criteria:

-Age >1 month and <18 years of age

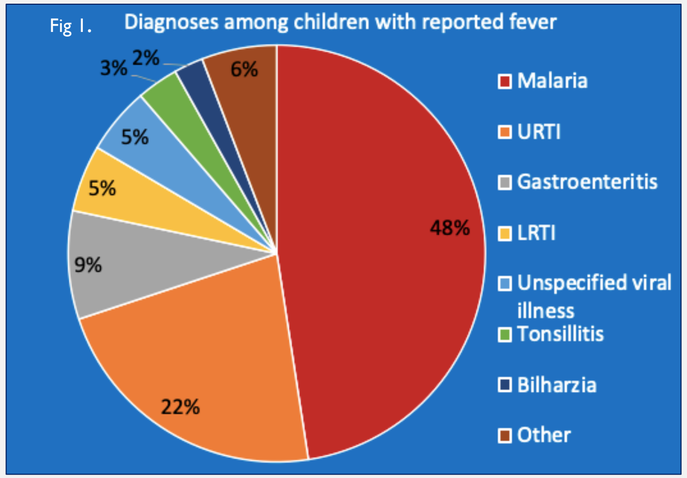
-Presenting to clinic with a reported fever

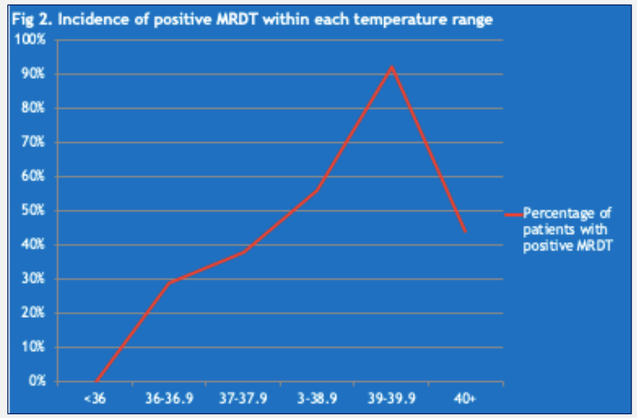
Exclusion criteria:

-Diagnosis and treatment of malaria within the past 14 days

Results

- 147/313 (47%) of children had a positive MRDT result. Of 313 children tested, 147 (47.3%) had a positive MRDT. These children were deemed to have malaria and treated with oral ACTs as per WHO Guidelines.
- Respiratory and gastrointestinal infections accounted for the majority of alternative diagnoses (Fig 1).
- There was no significant difference in mean duration of symptoms among patients with a positive MRDT compared with those with a negative result (51 hours vs 61 hours).
- There was no correlation between parents suspecting malaria and the patient having a positive MRDT result, nor between parents reporting the use of mosquito nets at night.
- There was a positive correlation between tympanic temperature measurement up to 40°c and the likelihood of a positive MRDT result. This correlation tapered off at temperatures >40°c. (Fig 2).
- Other predictors of a positive MRDT included symptoms of vomiting (OR 3.47, p <0.0001), vomiting plus headache (OR 11.44, p 0.0012), while negative predictors included upper respiratory tract symptoms (OR 0.1, p <0.0001).





Limitations

-Small sample size

-MRDT does not have100% sensitivity and specificity

-Language barrier between doctor and patient/guardian

-Interchangeable meaning of the term *malungo*

-Study conducted in a single clinic

Discussion

The accurate and prompt diagnosis and treatment of malaria is a constant challenge in resource-poor settings in endemic areas. The WHO recommends initiation of treatment within 24-48 hours of onset of malaria symptoms[2], highlighting the need for parents, guardians and patients in endemic areas to be well-versed in identifying symptoms in order to seek prompt treatment. A study of Malawian mothers found more timely seeking of health services among those who recognised fever as a symptom of malaria[3], suggesting that understanding the symptomatology can play a key role. However, a study of parental perceptions of fever in a malaria endemic area found a poor knowledge of fever and the complications of malaria, and frequent administration of anti-malarial drugs without medical diagnosis[4]. Furthermore, there is no universally applicable clinical criteria for predicting malaria based on symptomatology, as predictive criteria vary between populations, and are ultimately insufficient in determining the need for treatment[5].

Conclusions

A diagnosis of malaria was predicted by symptoms of vomiting and headache, and by objectively elevated temperatures up to 40°c. Parents did not reliably differentiate the cause of symptoms at time of presentation, and children with malaria did not present earlier. While parental perceptions of fever vary in terms of understanding of cause and variation in management, the education of parents and guardians in the common symptoms of malaria and the need for prompt treatment can help ensure timely diagnosis and treatment.

References

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