A STUDY TO ASSESS INITIAL PARENTAL RESPONSE TO FEVER IN CHILDREN IN MBARARA, UGANDA, A MALARIA ENDEMIC REGION

A Preliminary Report

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Malaria in Uganda

- Malaria is the leading cause of morbidity and mortality of children in Uganda, approximately 8–13 million episodes per year.

- *Plasmodium falciparum*, the most deadly of the malaria parasites, is responsible for the majority of the cases.

- In 2009, the prevalence of malaria parasitemia, based on light microscopy, was approximately 30–50% of children aged 6–59 months old.
A study by Nuwaha et al directly examined people’s perception of malaria in Mbarara, through the use of focus groups and interviews (2002).

95% of participants reported that mosquitoes were responsible for transmission of malaria.

Prevention strategies:
- 46% of participants reported use of bed nets
- 28% reported keeping surroundings clean, environmental sanitation
- only 5% percent reported immediate treatment of fever
Several studies performed in sub-Saharan Africa have demonstrated a correlation between fever and *P. falciparum* parasitemia.

- A study conducted in Mali, 33.6% of fevers in children were attributable to malaria (Dicko et al 2005).
- In southern Ghana the fraction of fevers attributable to malaria was 44% in children up to two years of age (McGuinness et al 1998).

Several studies performed in Uganda, Ghana, and Nigeria have shown that fever is one of the most recognized signs of malaria within the community (Agu et al 2005, Asante et al 2010, and Tumwesigire et al 2002).
Although malaria remains the leading cause of fever in children in sub-Saharan Africa, there are many other common causes of fever in children.

The Mbarara Hospital Annual Performance report, listed pneumonia and septicemia among the top five causes of morbidity and mortality in children.

Other common pediatric illnesses presenting with fever include viral and bacterial infections causing gastroenteritis, diarrhea or meningitis.

According to the 2006 Uganda Demographic and Health Survey, 41% of Ugandan children had fever in the two weeks preceding the survey.
Study Justification

- Given the large burden of fever in pediatrics, we propose a study to examine a parent’s initial response to a child’s fever.

- Delaying the seeking of treatment for malaria can be associated with worse outcomes.

- It is important to immediately treat non-malarial causes of fever that can be life threatening such as diarrhea or bacterial meningitis.

- In the effort to achieve malaria control and improve childhood morbidity and mortality due to common childhood illnesses, a first step is assessing parental awareness and response to fever.
Study Objectives

- To determine the initial response to fever among parents presenting with febrile children to Toto ward, Mbarara Regional Referral Hospital (MRRH).

- To identify factors that determine a parent’s initial response to fever in children presenting to the pediatric ward of MRRH.
Methodology

- **Study Location**
  - The study was conducted in the Pediatric ward of Mbarara regional referral hospital.

- **Study subjects**
  - Interviewees were the parents or the primary care givers of sick children aged 0 – 12 years presenting with fever as one of the chief complaints.

- **Study design**
  - This is a cross sectional study.

- **Sampling Method**
  - We used consecutive sampling to enroll participants in the study.
Methodology

- **Inclusion criteria**
  - Parents or primary care givers of children who present with a chief complaint of fever were included in the study.

- **Exclusion criteria**
  - Neonates or children with fever referred to the pediatric ward from the Obstetrics and Gynecology department or any other department of MRRH, were not included.
Methodology

- The sample size was calculated using the Kish and Leslie formula:
  - $N = Z^2 \times (P) \times (1-P)/C^2$

  - $N=$ sample size, $Z = 1.96$ for 95% CI, $P=$ estimated prevalence of fever, $C =$ margin of error (5%).

- For the purpose of this study, we used the prevalence of fever in children in Uganda as 41% as reported in the Uganda Demographic Health Survey (UDHS, 2006).

- With a margin of error of 5% and 95% confidence intervals, a sample size of 372 respondents was calculated.

- Within the two week time period for data collection, 74 respondents were interviewed
Methodology

Data collection and instrument

- A questionnaire with pre-coded multiple choice options was administered to parents of sick children who present with a chief complaint of fever.

- The questionnaire included questions on demographics of the parents and children, and also assessed initial parental decisions in response to their child’s fever.

- Factors that may influence parental initial response to fever were also assessed.
Methodology

- **Data analysis:**
  - The Data was analyzed with use of Microsoft Excel

- **Quality control**
  - The questionnaire was translated into the local language of Runyankole to decrease variability in question translation.
  - The questionnaire was administered with the use of an interpreter to help decrease the limitations of the language barrier.
Child Demographics

- Average age of the child
  - 19.7 months
  - Minimum age 1 week
  - Maximum age 9 years
Demographic Information—II

- **Parent Demographics**

  ![Marital Status Pie Chart]

  - Married: 82% (n=61)
  - Single: 6% (n=6)
  - Separated: 9.4% (n=7)
  - Widowed: 1.3% (n=61)

  ![Type of Housing Pie Chart]

  - Semi-permanent: 37% (n=47)
  - Permanent: 62% (n=29)
Demographic Information—III

Occupation
Father
- Peasant n = 24 (33%)
- Business n = 20 (28%)
Mother
- Peasant n = 51 (65%)
- Business n = 8 (10.8%)

Education: Father
- Primary N=35 (53%)
- Secondary N=19 (29%)
- College N=5 (7.6%)
- University N=2 (6.1%)
- None N=4 (3%)

Education: Mother
- Primary N=43 (58%)
- None N=23 (42.5%)
- Secondary N=10 (13.6%)
- College N=3 (4%)

Patient Districts

District
Mbarara Isingiro Kiruhura Sheema Ibanda Ntungamo Other
% of respondants
0 10 20 30 40 50 60 70

Other Districts n=8
Kabale, Lakai, Kamwenge, Kisoro, Lwengo, Kasese, Rukungiri, Bushenyi
### Accessing the Hospital

<table>
<thead>
<tr>
<th>Transportation Method</th>
<th>Boda-boda</th>
<th>On Foot</th>
<th>Taxi</th>
<th>Ambulance</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>32</td>
<td>2</td>
<td>38</td>
<td>2</td>
</tr>
<tr>
<td>Percentage</td>
<td>51%</td>
<td>2.7%</td>
<td>2.7%</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

#### Average Distance from Hospital
- Minimum distance: 1.5 km
- Maximum distance: 122 km
- Average: 33.6 km (SD 36.2)

#### Average Time to Hospital
- Minimum time: 5 minutes
- Maximum time: 12 hours
- Average: 1.6 hours (SD 1.9)

#### Average Transportation cost
- Minimum cost: Ush 0
- Maximum cost: Ush 60,000
- Average: Ush 6,168 (SD 7811)
<table>
<thead>
<tr>
<th>Symptom</th>
<th>N</th>
<th>%</th>
<th>Average duration in days (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>74</td>
<td>100</td>
<td>5.9 (7.9)</td>
</tr>
<tr>
<td>Cough</td>
<td>56</td>
<td>75</td>
<td>7.8 (17.4)</td>
</tr>
<tr>
<td>Difficulty in breathing</td>
<td>54</td>
<td>72</td>
<td>5.7 (9.9)</td>
</tr>
<tr>
<td>Convulsions</td>
<td>7</td>
<td>9</td>
<td>2.5 (2.2)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>38</td>
<td>51</td>
<td>5.1 (6.3)</td>
</tr>
<tr>
<td>Vomiting</td>
<td>49</td>
<td>66</td>
<td>4.7 (5.5)</td>
</tr>
<tr>
<td>Body Swelling</td>
<td>11</td>
<td>14</td>
<td>10.9 (11)</td>
</tr>
<tr>
<td>Dark Urine</td>
<td>31</td>
<td>41</td>
<td>6.06 (4.9)</td>
</tr>
<tr>
<td>Loss of consciousness</td>
<td>18</td>
<td>24</td>
<td>3.4 (4.8)</td>
</tr>
<tr>
<td>Poor breast feeding</td>
<td>49</td>
<td>66</td>
<td>8.5 (14.3)</td>
</tr>
<tr>
<td>Yellowing of eyes</td>
<td>3</td>
<td>4</td>
<td>6 (1.7)</td>
</tr>
<tr>
<td>Other (constipation, epistaxis, mouth ulcers, pallor)</td>
<td>12</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>
Initial parental responses to their child’s fever

Parental Choices

<table>
<thead>
<tr>
<th>Clinic</th>
<th>Hospital</th>
<th>Drug Shop</th>
<th>Leftover Drugs</th>
<th>Herbs</th>
<th>Other Health Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=33</td>
<td>N=13</td>
<td>N=14</td>
<td>N=2</td>
<td>N=4</td>
<td>N=8</td>
</tr>
</tbody>
</table>

Drugs Administered

<table>
<thead>
<tr>
<th>Drug</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol</td>
<td>31</td>
<td>41</td>
</tr>
<tr>
<td>ACT/Coartem</td>
<td>10</td>
<td>13.5</td>
</tr>
<tr>
<td>Quinine</td>
<td>6</td>
<td>8.1</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>7</td>
<td>9.4</td>
</tr>
<tr>
<td>Ampicilliam</td>
<td>5</td>
<td>6.7</td>
</tr>
<tr>
<td>Amoxil</td>
<td>6</td>
<td>8.1</td>
</tr>
<tr>
<td>Septrin</td>
<td>5</td>
<td>6.7</td>
</tr>
<tr>
<td>Herbs</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td>Cough syrup</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td>Penicillin</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Flagyl</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Oral rehydration solution</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Unidentified syrup, tablets, or injections</td>
<td>24</td>
<td>32</td>
</tr>
<tr>
<td>Unknown</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td>Nothing administered</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>
Timing of Parental Response to Fever

After how long did you take action from the onset of fever?

When did you first take your child to a health care worker?
Reasons for going to the Hospital

Why did you choose to come to this hospital?

- Belief in Rx: N=21
- Good Experience: N=4
- Proximity: N=2
- Severity of illness: N=48
- Referral: N=19
Reasons for not going to the hospital first

N= 17

% of respondents

Parental quotes:

• “I wanted to first reduce the fever with paracetamol”

• Another respondent was told by relatives that her child had a “traditional” illness.
In Hospital Diagnoses

Other Diagnoses:
- Heart failure
- Tumor
- UTI
- Renal disease
- Leukemia
- TB
- Cellulitis
- Salmonellosis
- Pneumothorax
The majority of the study participants were poor peasants living in semi-permanent housing with little formal education.

The study population reflects the typical rural population found of Uganda.

The most favored parental response to fever was to utilize a nearby clinic.
- Many of the respondents also chose to utilize a hospital or health center.
- Similar results were observed in studies conducted in Kabale, Uganda and Ebony State, Nigeria (Agu et al 2005 and Tumwesigirie et al 2002).
Although, 60% of the respondents reported taking action in response to the onset of their child’s fever within 24 hours, there was a delay in seeking out health care workers.

Only 40% of the respondents reported seeing a healthcare worker within 24 hours of the onset of fever.

Almost 30% of the respondents reported waiting more than three days to seek out a healthcare worker.

This delay in seeking out a healthcare worker, can be attributed to the fact that the majority of the respondents who did not go to the hospital or clinic first reported that they didn’t feel the child was sick enough.
Malaria was the most common diagnosis ascribed to the febrile children on admission.

The second most common diagnosis on admission was pneumonia.

However, when examining the final diagnoses, we found that there were more children diagnosed with pneumonia than malaria.

It must be noted that many of the children were tested for malaria with the use of a single blood smear.

However, a low parasitemia can be missed with only one blood smear. With the advent of rapid diagnostic tests (RDT), which can be more sensitive than blood smears, there can be improved diagnosis of malaria.
Study Limitations

- The use of a hospital sample may not be a true representation of the general population.

- It would be ideal to randomly sample the community and interview parents whose children had fever.

- Due to time constraints, I was not able to obtain the sample size before departing.
  - My supervisor hopes to ensure completion of data collection even after my departure.

  - Upon completion of the data collection it will be interesting to look for statistically significant associations between variables, such as correlations between education level, occupation, duration of symptoms and the response to fever.
The WHO Recommendations
- Children under age 5, living in highly malaria endemic regions, should be diagnosed clinically and treated presumptively with antimalarials.
- ACTs are the first line recommended treatment against *P. falciparum*.
- Use of parasitological diagnosis is recommended for children over age 5 that develop fever.

Given these recommendations, parents should be counseled and educated to seek out the help of a health care worker as soon as possible when their child becomes febrile to help aid in the diagnosis and treatment of malaria.

In addition, a health care workers can help to identify potentially life-threatening non-malarial causes of fever such as pneumonia and gastroenteritis, which are also extremely common in this pediatric population.
Acknowledgements

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- All Study participants
References


- Asante et al., Community perceptions of malaria and malaria treatment behaviour in a rural district of Ghana: implications for artemisinin combination therapy BMC Public Health 2010, 10:409


