Introduction

Malaria endemic countries have scaled-up community health worker (CHW) interventions to increase access to malaria testing and treatment to vulnerable communities with limited access to public health systems. These interventions have the potential to reduce the health centres caseload by providing malaria diagnosis and treatment services within communities.

The aim of this analysis is to examine the effects of introducing a CHW-intervention on health centre attendances in South West Uganda.

Methods

Study Context

This study was conducted as part of a cluster randomised trial, which compared the impact of CHWs using malaria rapid diagnostic tests (mRDTs) on the proportion of children receiving artemisinin combination therapy (ACT) with CHWs using a presumptive diagnosis.

Table 1. The structure of the health system in Bwambara Sub-county, Uganda

<table>
<thead>
<tr>
<th>Health Centre</th>
<th>Services</th>
<th>Number of</th>
<th>Catchment Area</th>
<th>Population served</th>
<th>Malaria diagnosis method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Centre II</td>
<td>Outpatient</td>
<td>2</td>
<td>Parish</td>
<td>5,000</td>
<td>mRDT</td>
</tr>
<tr>
<td>Health Centre III</td>
<td>Outpatient, maternity, inpatient ward, microscopy</td>
<td>1</td>
<td>Sub-county &amp; Parish</td>
<td>20,000</td>
<td>mRDT + light microscopy</td>
</tr>
</tbody>
</table>

Data Collection

- Data was extracted from out-patient department treatment registers during two time periods, 1) 12 months prior to the CHW-intervention starting (May 2009 - April 2010: Pre-intervention period) 2) 20 months of the CHW-intervention (May 2010 - Dec 2011: Intervention period).

- Included all children visiting a health centre

Statistical Analysis

Longitudinal OPD attendance data was analysed using an interrupted time-series approach with segmented regression models.

Two main outcomes were examined:

a) Malaria specific visits
b) Non-malaria visits
c) Overall visits

Model specification:

\[ Y_t = \beta_0 + \beta_1 \times \text{time} + \beta_2 \times \text{intervention} + \beta_3 \times \text{time after intervention} + \epsilon_t \]

- \( Y_t \) = Number of child visits (outcome) in month \( t \) at a health centre.
- \( \text{time} \) = Time in months at time \( t \) from the start of the pre-intervention period to the end of the intervention period.
- \( \text{trial} \) = Indicator variable for time \( t \) before the start of the CHW-intervention (intervention=0) or after the start of the CHW-intervention (intervention=1).
- \( \text{time after intervention} \) = Number of months after the CHW-intervention at time \( t \).
- \( \beta_0 \) = Estimates the number of visits per month at time 0 (baseline level). 
- \( \beta_1 \) = Estimates the secular trend in the number of visits per month over the entire period.
- \( \beta_2 \) = Estimates the level change in the number of visits per month immediately after the CHW-intervention.
- \( \beta_3 \) = Estimates the change in trend in the number of visits after the start of the CHW-intervention.
- \( \epsilon_t \) = Error term at time \( t \) that represents random variability not explained by the model.

Results

Table 2: Changes in visits, results from segmented linear regression models

<table>
<thead>
<tr>
<th></th>
<th>Malaria visits</th>
<th>Non-malaria visits</th>
<th>Overall visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant (β0)</td>
<td>207.7**</td>
<td>106.0***</td>
<td>296.3***</td>
</tr>
<tr>
<td></td>
<td>(70.9)</td>
<td>(23.3)</td>
<td>(46.5)</td>
</tr>
<tr>
<td>Secular trend (β1)</td>
<td>19.2*</td>
<td>5.6</td>
<td>32.7***</td>
</tr>
<tr>
<td></td>
<td>(8.9)</td>
<td>(3.2)</td>
<td>(6.3)</td>
</tr>
<tr>
<td>Change in level after intervention (β2)</td>
<td>-245.0***</td>
<td>-39.8</td>
<td>-427.9***</td>
</tr>
<tr>
<td></td>
<td>(65.9)</td>
<td>(27.4)</td>
<td>(54.0)</td>
</tr>
<tr>
<td>Change in slope after intervention (β3)</td>
<td>-27.1*</td>
<td>-1.8</td>
<td>-32.3***</td>
</tr>
<tr>
<td></td>
<td>(11.0)</td>
<td>(3.5)</td>
<td>(7.0)</td>
</tr>
</tbody>
</table>

Summary of findings

- Malaria and overall visits declined sharply after the introduction of a CHW-intervention. Whilst, non-malaria trends remained the same.
- Three months after the intervention, malaria visits had declined by 69%, and overall visits by 63%, when compared to the pre-intervention period.
- The proportion of non-malaria diagnoses (respiratory tract infections, pneumonia, diarrhoea, helminths) increased as the proportion of children diagnosed with malaria decreased.

Conclusions

- Our findings indicate that CHW interventions are likely to reduce visits at health centres and may make more time available for health workers to spend time with patients.
- Health worker’s role may be expanded to include additional tasks such as outreach services, or supervision of CHWs.