**Department of Public Health Sciences, Division of Global Health**

# Community Case Management of Malaria and Pneumonia in Children - Exploring use of diagnostics by community health workers in Uganda

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# ABSTRACT

**Background:** Malaria and pneumonia are leading causes of under-five mortality in Sub-Saharan Africa. WHO/UNICEF recommend integrated community malaria and pneumonia care in situations where febrile children also have cough and rapid breathing. Presumptive treatment of all fevers as malaria leads to excessive use of anti-malarial drugs and delays the recognition and treatment of non-malaria fevers. Using malaria rapid diagnostic tests (RDTs) and respiratory rate counting could be a potential solution.

**Main aim:** To assess community acceptability and utilisation, provider competence, and the effectiveness of diagnostic-based integrated community case management of malaria and pneumonia in children in order to inform implementation.

**Methods:** Four studies (I-IV) were conducted in Iganga district, Uganda with data for Study IV collected at two additional sites in Burkina Faso and Ghana. In Study I, 10 key informant interviews with health workers and community leaders, and 10 focus group discussions with CHWs and caregivers were done. Study II was a prospective case series with 182 child observations. Study III was a cross-sectional study with 423 caregivers of under-fives. Study IV was a cluster randomised controlled trial (cRCT) with 4,216 under-fives. Content analysis was used for qualitative data. Quantitative data was analysed at uni-, bi- and multivariate levels, while analysis of Study IV was by intention to treat.

**Results:** From the cRCT, the odds of having fever on day 3 was 41% lower in the intervention arm compared to the control arm (OR 0.59, 95% CI 0.38, 0.93; p=0.02). Community acceptability of use of RDTs by CHWs was high (89%; 375/423) (III). Some community members had fears about drawing blood (I), but reports of these were few in Study III (4/423). Most (86%, 365/423) households resided within 1 km of a CHW, compared to 26% (111/423) residing within 1 km of a health facility (p<0.001). CHWs were the first option for care of febrile children (40%, 242/601), and 3-month utilisation was 57% (243/423). CHWs' performance was adequate in taking history, using timers and RDTs, but inadequate in classification of illness. Breath readings (classified as fast or normal) were 85% in agreement with the paediatrician ($\kappa = 0.665$, p < 0.001) with a sensitivity and specificity of 81% and 87% respectively (II). In the cRCT, there was good compliance with RDT results in the intervention arm with most (1739/1740) RDT positive children prescribed an anti-malarial, and only 4.9% (17/344) of RDT negative children prescribed an anti-malarial drug. Among children with a high respiratory rate, antibiotics were administered to 86.5% (198/229) in Burkina Faso, 72.5% (103/142) in Ghana, and 98.3% (520/529) in Uganda. Antibiotic overuse was 0.9% (4/446) in Uganda, 38.5% (114/296) in Burkina Faso, and 44.6% (197/442) in Ghana.

**Conclusion:** Diagnostic-based iCCM improves fever clearance in febrile children compared to presumptive treatment of malaria. RDTs and ARI timers should be introduced into iCCM programmes. CHWs used the two diagnostics to distinguish and treat both malaria and pneumonia; the strategy improves access to treatment for both conditions among under-fives; and communities welcomed the diagnostic-based strategy. While CHW compliance with RDT results was high, compliance to respiratory rate results for pneumonia was lower. Programmes should plan for adequate resources to support CHWs with supplies, logistics and supervision for quality iCCM.

**Key words:** malaria, pneumonia, case management, community health worker, diagnostics, child, Uganda