Improving health care worker performance in clinical case management of malaria and other febrile illnesses in eight sub-Saharan African countries

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Introduction

Children in sub-Saharan Africa experience an estimated 3-4 episodes of fever per year. The need for health care workers (HCWs) to differentiate malaria from other infectious diseases and treat them appropriately is key to averting excess morbidity and mortality from febrile illnesses. MalariaCare, a President's Malaria Initiative-funded global project, has worked with National Malaria Control Programs (NMCPs) in 17 countries to train a cadre of clinical experts as on-site supervisors. These supervisors work with local staff at the health facility level to perform on-site outreach training and supportive supervision (OTSS), a mentorship program to improve clinical case management skills.

Objective

To assess the impact of OTSS on HCW clinical competencies in febrile case management.

Methods

The analysis includes health facilities in 8 sub-Saharan African countries that received at least 2 OTSS visits supported by MalariaCare. During each visit, supervisors observed 1-3 HCWs during clinical consultations using a 25-step checklist, and provided constructive feedback after the observation(s). Summary performance scores were calculated by weighting the 4 most important steps as 2/3 of the score and the remaining 21 steps as 1/3 of the score. Individual HCW scores were averaged to generate health facility scores, which were then tracked over the first, second, and third visit.

To assess the impact of OTSS on clinical competencies, the proportion of HCWs conducting each checklist step correctly was compared for the first and last visit (either 2nd or 3rd visit). Average health facility scores were calculated for the subset of facilities having 3 visits and at least one complete observation for each visit. Finally, to estimate the effects of other factors that could have affected scores, a multi-level mixed effects linear regression (with clustering at health facility level) was run.

Results

The proportion of HCWs correctly performing each step improved between the first and last visit (Table 1). Of the 4 most important steps (in bold), 'checking for at least one sign of severe malaria' was both at the lowest baseline level (74.3%), and showed the largest improvement (12.1%). Several other history-taking and physical exam steps were less frequently performed by HCWs, but improved 1.0-19.4%.

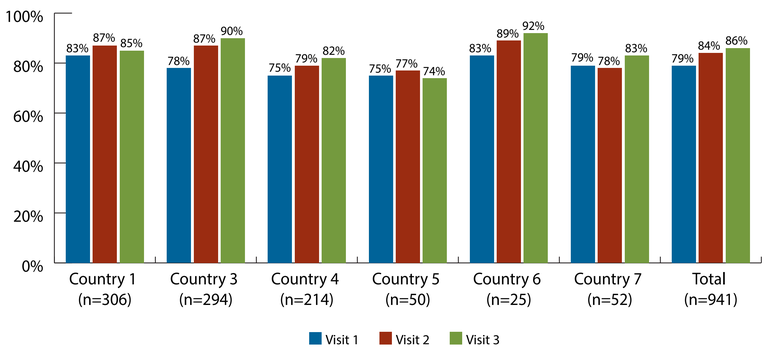
Table 1. Proportion of observed HCWs who performed clinical checklist steps correctly: first and last visit (n=7,137).

Clinical observation checklist step	First Visit	Last Visit	Difference
N	3758	3379	
Determines age of patient	92.0%	95.0%	+3.0%
Determines weight of patient	81.9%	86.7%	+4.8%
Asks whether patient is pregnant (count as yes if male or not of reproductive age)	81.7%	87.1%	+5.4%
Asks about current or recent fever	94.5%	95.5%	+1.0%
Asks about diarrhea	65.0%	76.1%	+11.1%
Asks about vomiting	71.8%	81.8%	+10.0%
Asks about coughing	71.2%	79.1%	+7.9%
Asks about any other symptoms	40.6%	51.5%	+10.9%
Asked whether patient was treated prior to visit (at home or another facility)	59.6%	68.8%	+9.2%
Checks for at least one sign of severe malaria (or apparent)	74.3%	86.4%	+12.1%
Checks for evidence of anemia	78.1%	87.2%	+9.1%
Checks for fast breathing or chest in-drawing	44.4%	60.1%	+15.7%
Checks heart rate	34.2%	50.6%	+16.4%
Takes temperature	77.5%	85.6%	+8.1%
Conducts neck exam/checks for stiffness	31.8%	47.1%	+15.3%
Conducts lung exam	31.1%	46.9%	+15.8%
Conducts abdominal exam/checks for abdominal stiffness	40.0%	58.2%	+18.2%
Conducts skin exam/checks for rash or dehydration	41.5%	60.9%	+19.4%
Checks for altered consciousness	40.7%	56.3%	+15.6%
Supervisor agrees with whether a malaria test should be ordered*	93.2%	94.0%	+0.8%
Supervisor agrees with final diagnosis and severity assessment	92.1%	96.1%	+4.0%
Correct prescription per test result & diagnosis	93.8%	95.9%	+2.1%
Informs caregiver on what is wrong with the patient	84.5%	90.8%	+6.3%
Gives advice on how to take the prescribed medications (outpatients) or informs caregiver of transfer (inpatients)	82.1%	89.3%	+7.2%
Asks caregiver/patient whether they have any questions	35.8%	47.7%	+11.9%

Note: Not included in the score (since not asked in every country) was providing advice about malaria prevention measures. The proportion of observations that did this step increased from 40.0% (n=2109) to 48.4% (n=2805)

Six out of 8 countries had health facilities with a complete observation during each of 3 visits total, and average scores improved from 79% during the first, to 84% during the second, and to 86% during the third visit (Figure 1). Five out of 6 countries saw improvements between the first and third visit.

Figure 1. Average clinical performance score over consecutive rounds of OTSS, by country (n=941)



Results, continued

Multiple regression analysis estimated that controlling for other factors, health facility scores improved by 5% by the second visit ($p<0.001$). Estimated performance improvement between the second and third visit was 0.9% ($p=0.01$). Having had a prior OTSS visit using a different, less detailed checklist was not found to be statistically significant at the 5% level.

Aside from the country that the visit occurred in, other factors measured by the checklist and included in the regression had a smaller estimated effect on health facility scores than having OTSS visits with the 25-step checklist (having the most recent malaria case management guidelines and algorithms; all HCWs observed during the visit being a doctor and/or having formal training in malaria case management; having no stock-outs of ACTs for more than 7 days in the past 3 months; and the facility being a hospital).

Table 2. Regression results for visit characteristics associated with percentage point change in scores (n=6,606).

Characteristic	Coefficient	95% CI
Number of visits (ref: 1 visit)		
2	5.0	[4.4,5.6]
3	5.9	[5.2,6.7]
Had prior OTSS visits	1.2	[-0.3,2.7]
Facility has most recent malaria case mgmt. guidelines	1.7	[1.0,2.5]
Facility has malaria case mgmt. algorithms	1.9	[1.1,2.7]
All health workers observed are a doctor/medical officer	1.4	[0.4,2.4]
All health workers observed have formal training in malaria case mgmt.	2.1	[1.5,2.7]
No stockout of ACT >7 days in past 3 months	0.8	[0.0,1.6]
Facility is a hospital	1.7	[0.7,2.8]

Note: Country was also included as a control variable in the regression; because countries were anonymized, results are not presented here.

Discussion

During the first visit, the majority of observed HCWs correctly conducted key steps in malaria test ordering, diagnosis, and treatment and, to a lesser extent, checking for signs of severe malaria. Physical exams and history taking were often incomplete. Our analysis indicates that OTSS does improve compliance with these steps after 2-3 visits. Improvements could be due to focused on-the-job coaching and supervisors providing individualized observational feedback to providers.

Some of the greatest improvements were observed in the area of assessing signs of severe disease, which started low. To reduce malaria-related mortality, these improvements need to attain the 90% target. Internal quality assurance mechanisms built within facilities – such as continued medical education/certification, and facility quality assurance committees – could be used to sustain OTSS achievements. Updating pre-service clinical curricula and emphasizing the importance of complete history taking and physical exams may increase case management competencies and quality of care over the long term.

Conclusion

OTSS improves clinical competencies and facility performance data may guide national program managers' decisions on frequency of visits as well as optimal number of visits needed to achieve and maintain a certain level of performance.

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