"My Child is Too Hot": Community-based Management of Fevers in a Low-resource Setting in Zambia

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CCDE/IOM: AMFm and the Financing of Febrile Illness Management Meeting

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Background

- Pneumonia and Malaria are the leading causes of morbidity and mortality in young children in sub-Saharan Africa
- Sick children in rural Zambia often seen by community health workers (CHW) because public health facility-based services not readily accessible
- Zambia policy calls for CHWs to refer all children with pneumonia to nearest health facility and to treat all fevers as presumptive malaria
- Little data available regarding how to optimally deploy artemisinin-based combination therapy (ACT) at the community level

Study Design

- Cluster randomized controlled trial
  - One follow-up visit at day 5-7 after CHW evaluation

- Eligibility criteria
  - Children aged 6 months to 5 years with:
  - Fever and/or fast/difficult breathing
  - Absence of severe illness

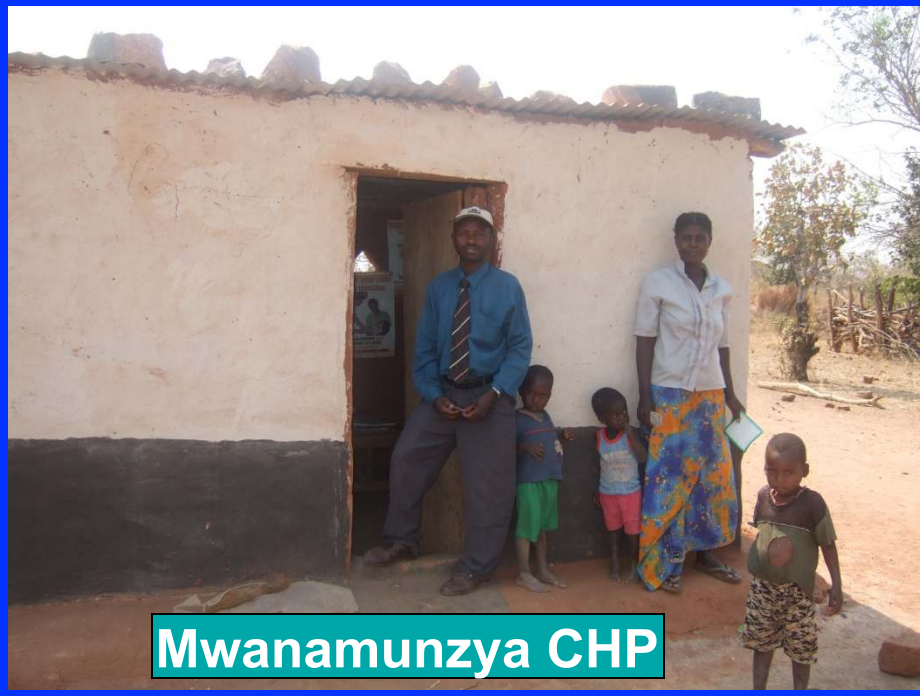
Study Site

- Southern Province of Zambia
- Mazabuka and Siavonga districts
- Chikankata Mission Hospital area
- Population : 70,000
- 1 mission hospital and 5 rural health centers

Study Sites

Chaanga RHC

Hamukombwe CHP



Mwanamunzya CHP

Objectives

- Will providing CHWs improved tools to classify and treat pneumonia (a simplified clinical algorithm and respiratory timers/thermometers) lead to increased early and appropriate treatment for pneumonia?
- Will the use of RDTs lead to a reduction of inappropriate malaria treatment and overuse of ACT?
- How well are CHWs able to classify and prescribe treatment for pneumonia and malaria?
- Can the CHWs handle the supplies well?
- What adverse effects will be encountered?

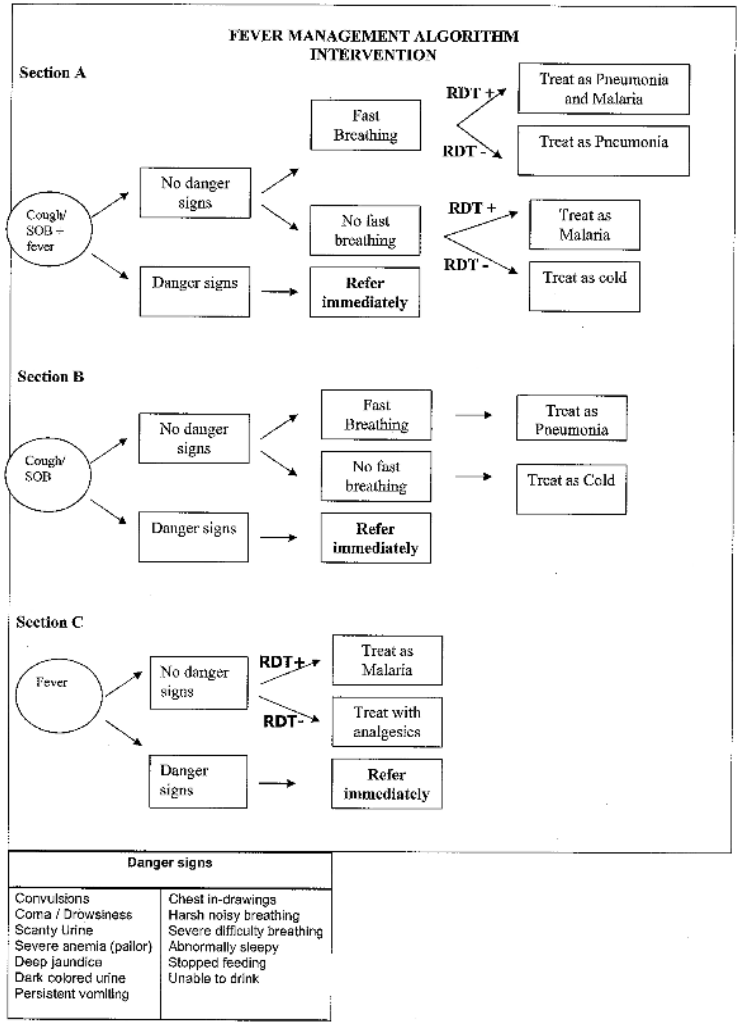
Training of Study Personnel

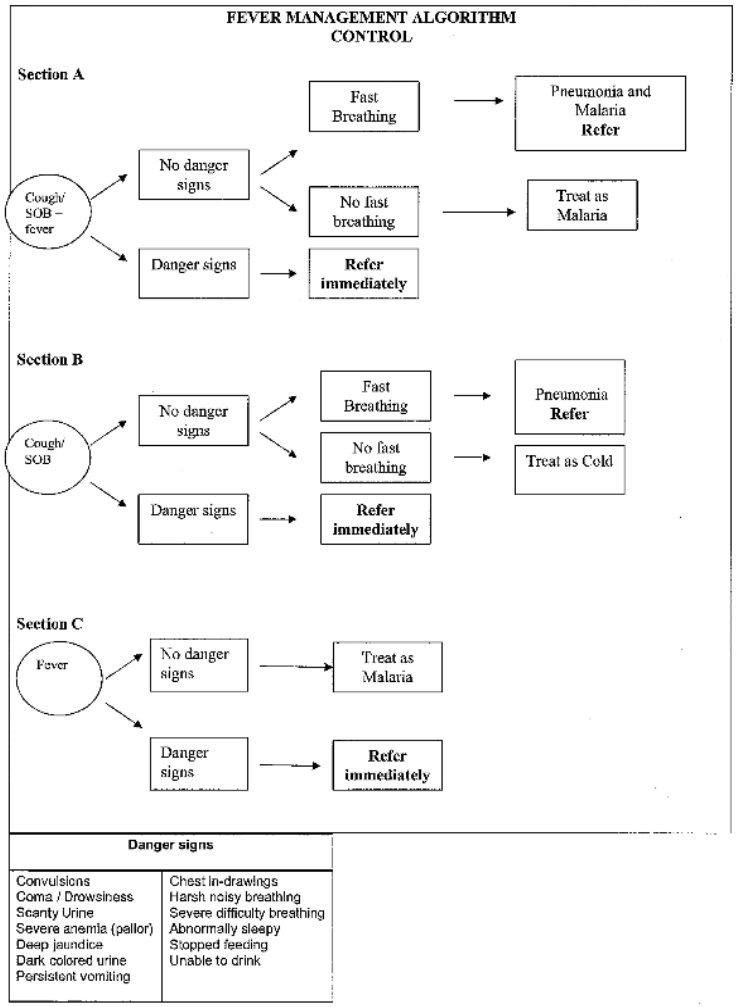
- CHWs (intervention and control)
  - Classification of malaria and pneumonia
  - Identification of serious illness
  - Referrals using two part referral form for feedback
  - Training methods: video, clinical, demonstration, practice
  - Facilitation from DHMTs and RHC staff

Training of Study Personnel

- CHWs (intervention only)
  - Performance and interpretation of RDTs
  - Prescription of amoxicillin for treatment of pneumonia
- Health workers at rural health centers (RHC)
  - IMCI
  - Supervision and support
  - Performance assessment

Treatment Algorithms





CHW Supplies

- Key supplies
  - Pictorial job aide (laminated)
  - ACT (artemether-lumefantrine)
  - Amoxicillin tabs/caps
    - Prepackaged in dispensing envelopes
  - Paracematol tablets
  - RDTs (ICT South Africa)
  - Timers/thermometers/weighing scales
- Source of supplies
  - Project office collected from DHMTs
  - Distribute to CHPs on monthly basis

CHW Support

- Supervision
  - CHW provided with bicycles
  - Visit RHC at least once a month
  - Work with RHC
  - Registers and records checks
- Performance assessment
  - At least once every quarter
- Refresher training

Types of Data Collected

- Monthly collection of data from CHPs and RHCs
  - Patients seen and categorization
  - Availability and use of supplies
  - Referrals
- Baseline and post intervention household surveys
  - Health seeking practices
- Post intervention qualitative data collection
  - FGDs and IDIs of caregivers
  - IDIs of CHWs, health workers, community leaders

Baseline Characteristics of CHWs

	Intervention (n=18)	Control (n=19)
Male	83.3%	89.5%
Age in years: mean (range)	40.3 (26-53)	40.0 (27-55)
Education: secondary	72.2%	64.4%
Considered as full time	5.6%	26.3%
Years of practice: mean (range)	10.2 (1-26)	7.3 (1-22)
Last refresher course: less than a year	55.6%	52.6%
Supervision by RHC in last 3 months	44.4%	42.1%
Distance of CHP from RHC: Mean (range) km	9.2 (1-15)	9.3 (3-15)

Baseline Characteristics: Participants

Characteristics	Intervention (n=1017)	Control (n=2108)
Sex (female) (%)	47.6%	48.8%
Age (mean) (SD) months	22.6 (14.0)	23.6 (14.7)
Children underweight (WAZ score <-2.00)	28.1%	30.3%
Mother's Education		
No formal education	45.4%	37.7%
Primary	45.5%	54.2%
Mothers occupation		
Farmer	58.1%	48.9%
Housewife	36.5%	46.4%
Households with 6 or fewer persons	64.2%	62.6%
Immunizations up to date	59.5%	67.5%
Slept under ITN last night	71.3%	69.5%

Primary Outcomes

	Control	Intervention	RR (95% CI)
Febrile children treated with AL	99.1%	27.5%	0.23 (0.14 – 0.38)
Appropriate treatment (13-15 doses of amoxicillin starting day of visit to CHW)	18. 7%	87.3%	4.66 (3.49 – 6.23)
Early and appropriate treatment (within 24-48 h symptom onset)	13.3%	68.2%	5.32 (2.19 – 8.94)

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PLoS MEDICINE

Community Case Management of Fever Due to Malaria and Pneumonia in Children Under Five in Zambia: A Cluster Randomized Controlled Trial

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Correct Classification: Intervention CHWs

Classify as malaria if RDT (+) and not malaria if RDT (-)

Classify as pneumonia if RR ≥ 50 in 6 -11 mo and RR ≥40 in 12 mo – 5 y and not as pneumonia if RR < 50 in 6 -11 mo and RR < 40 in 12 mo – 5 y

RDT test results of clinical feature	Expected (correct) classification	Appropriate classification N (%)
RDT positive and presence of fast breathing	Both malaria and pneumonia	100/103 (97.1%)
RDT positive and absence of fast breathing	Malaria	162/162 (100%)
RDT negative and presence of fast breathing	Pneumonia	223/239 (93.3%)
RDT negative and absence of fast breathing	RDT-negative fever	460/460 (100%)

Correct Treatment

Prescribe AL if classified as malaria; AL not prescribed if classified as not malaria

Prescribe amoxicillin if classified as pneumonia; and amoxicillin not given if not pneumonia

Classification	Correct Treatment	Appropriate treatment (%)
All malaria	AL	267/272 (98.2%)
Malaria only	AL	170/170 (100%)
All pneumonia	Amoxicillin	358/362 (98.9%)
Pneumonia only	Amoxicillin	257/260 (98.8%)
Malaria and pneumonia	AL and amoxicillin	96/102 (94.1%)
RDT-negative fever	Analgesics or no treatment	464/485 (95.7%)

Treatment for RDT Negative Fever

- Negative RDT = 704 children
  - Received treatment from CHW = 3 (0.4%)
  - Received treatment from other source = 5 (0.7%)
  - Other source was health facility

Negative RDT: Response to Anti-pyretic Alone (Day 5-7)

479 (who did not have pneumonia)

- 91.2% improved with anti-pyretic
- 8.8% did not improve (includes 1.7% lost to follow up)

Temp ≥ 37.5°C: 213

- 91.1% improved with anti-pyretic
- 8.9% did not improve (2.6% lost to follow up)

Adverse Effects Associated with RDTs

- Of 975 RDTs performed:
  - 3 children with minor bruises
  - 2 children with skin infection
  - 14 children with minor bleeding
  - 1 incident of self prick

Supply Management by CHWs

- Review of supplies provided and those remaining in CHW possession:
  - Full accounting for 99.6% of AL and amoxicillin
  - Full accounting for 98.9% of RDTs

Household Surveys
Source of first care (fever)

	Intervention		Control	
	Baseline (n = 181)	**Post (n = 187)**	**Baseline (n = 178)**	**Post (n = 204)**
Managed at home	14.2%	1.7%	10.5%	4.2%
CHW	43.0%	79.3%	44.8%	78.4%
Health center/hospital	58.4%	23.4%	54.1%	23.7%
Traditional/spiritual healer	5.3%	0	5.9%	1.1%

Household Surveys

Source of first care: fast or difficult breathing

	Intervention		Control	
	Baseline (n = 106)	Post (n = 54)	Baseline (n = 99)	Post (n = 35)
Managed at home	6.6%	3.0%	6.8%	8.8%
CHW	50.8%	77.3%	54.2%	55.9%
Health center/ hospital	42.6%	19.7%	39.0%	35.0%

Household Surveys

- Any death of under five in last 12 months? (combined control and intervention arms)
  - Baseline (Before ZIMMAPS): 18/439 (4.1%)
  - Post-ZIMMAPS: 11/441 (2.5%)

Qualitative: Caregivers Feelings About RDTs

- 100% of Intervention group felt okay when child was pricked
- Only 24% felt okay when told RDT result was negative
- 96% of Intervention group trusted such results
- All of them want the test available in future

Conclusions

- CHWs in rural Zambia are capable of appropriately classifying and treating non-severe pneumonia and malaria (using RDTs)
- Management of drug and commodity supplies was excellent
- Shift in care seeking led to greater use of CHWs and reduced burden on rural health centers
- Good initial training and monthly supervision at rural health centers critical to success of this iCCM program

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