Piloting the Children's Automated Respiration Monitor (ChARM) tool in Humanitarian Settings in Chad and Uganda

Presentation to SV and Philips
December 15, 2021

Presentation Overview

- Childhood pneumonia
- ChARM tool Assessment
- Assessment Results:
  - Quality-of-Care assessment
  - Focus Group Discussions (FGDs)
- Project learnings
- Recommendations
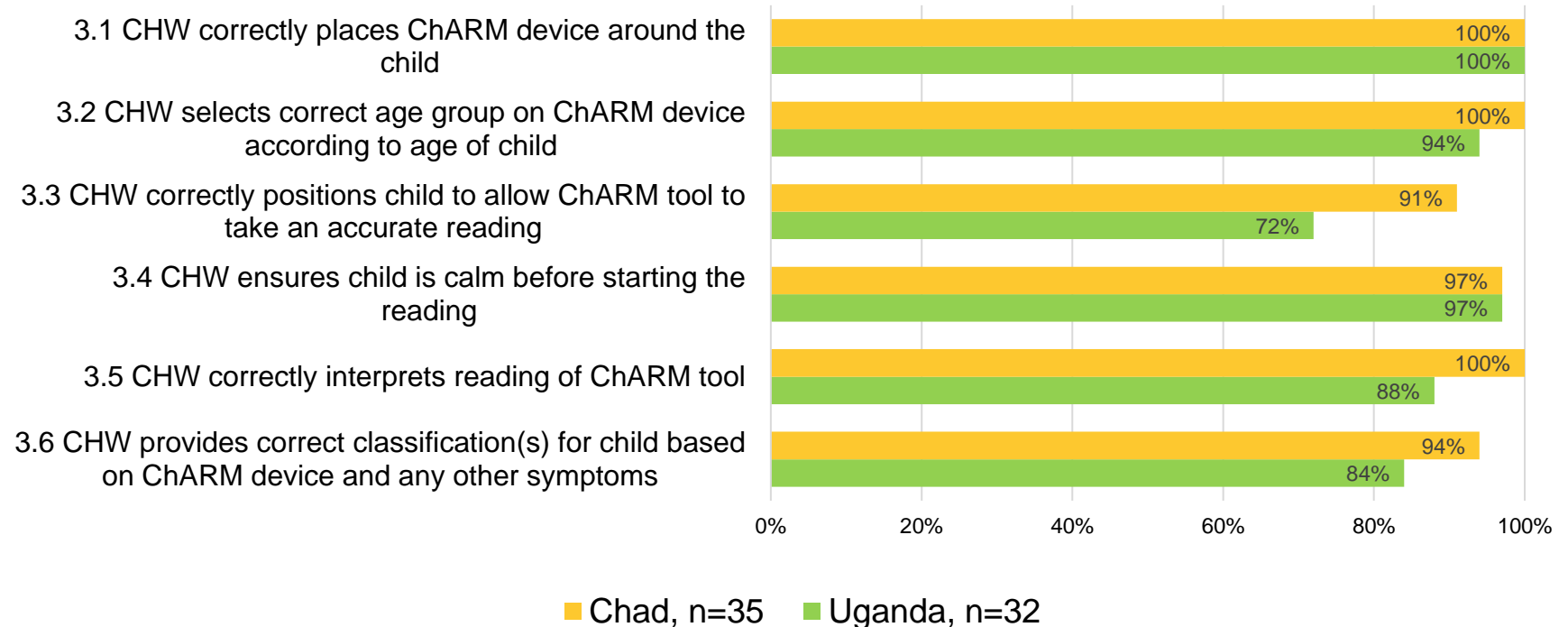- Next steps

Childhood pneumonia

- Pneumonia is the world's leading infectious disease killer of children under five

- Half of global pneumonia deaths occur in Sub-Saharan Africa

- Assessment of a child's respiratory rate is a critical component for diagnosing children with pneumonia in low-resource settings

- Counting respiratory rates is challenging and miscounting is common.

- This leads to inaccurate diagnosis and treatment, and irrational use of antibiotics.

ChARM tool Assessment

- The assessment aims to answer these three main questions:
    1. To what extent are low-literate Community Health Workers (CHWs) able to correctly use the ChARM tool?
    2. What is the effect of the use of the ChARM tool by low-literate CHWs in the facilitation of the identification, classification, and treatment of pneumonia in children under five?
    3. What is the impact of the ChARM tool on the quality of care provided to children under five with suspected pneumonia?
- A mixed-methods research design was used to answer these research questions.
- Quantitative methods included direct observations through a Quality of Care (QoC) checklist.
- Qualitative methods includes Focus Group Discussions (FGDs) with CHWs, caregivers and community members.
- Assessment was completed in August in Uganda and in September-October in Chad.
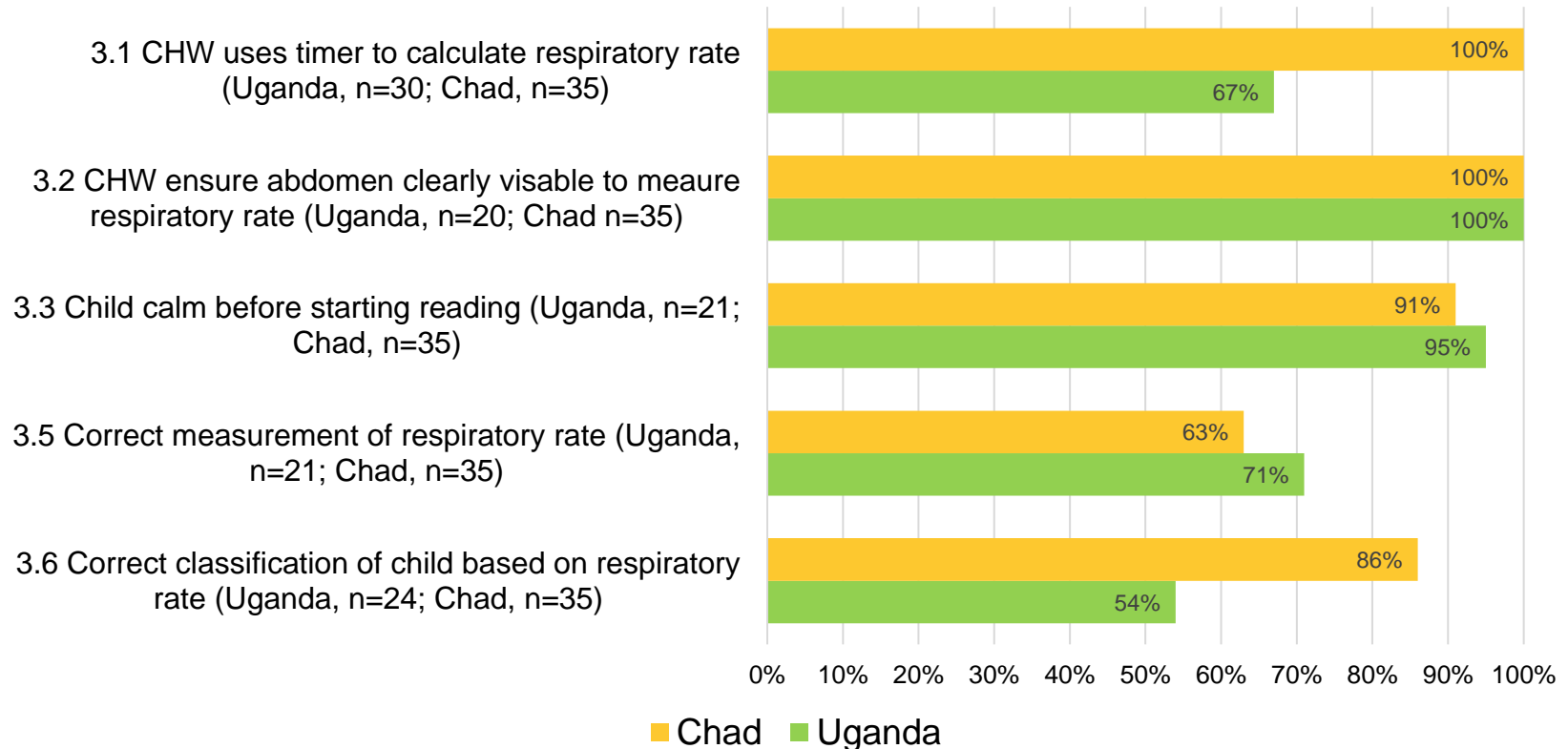
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Findings – Quality of Care Assessment

**CHWs using ChARM device to assess and classify respiratory rates
(INTERVENTION)**

	Chad, n=35	Uganda, n=32
3.1 CHW correctly places ChARM device around the child	100%	100%
3.2 CHW selects correct age group on ChARM device according to age of child	100%	94%
3.3 CHW correctly positions child to allow ChARM tool to take an accurate reading	91%	72%
3.4 CHW ensures child is calm before starting the reading	97%	97%
3.5 CHW correctly interprets reading of ChARM tool	100%	88%
3.6 CHW provides correct classification(s) for child based on ChARM device and any other symptoms	94%	84%

■ Chad, n=35   ■ Uganda, n=32

Findings – Quality of Care Assessment

CHWs not using ChARM device to assess and classify respiratory rate (CONTROL)

3.1 CHW uses timer to calculate respiratory rate (Uganda, n=30; Chad, n=35)
- Chad: 100%
- Uganda: 67%

3.2 CHW ensure abdomen clearly visable to meaure respiratory rate (Uganda, n=20; Chad n=35)
- Chad: 100%
- Uganda: 100%

3.3 Child calm before starting reading (Uganda, n=21; Chad, n=35)
- Chad: 91%
- Uganda: 95%

3.5 Correct measurement of respiratory rate (Uganda, n=21; Chad, n=35)
- Chad: 63%
- Uganda: 71%

3.6 Correct classification of child based on respiratory rate (Uganda, n=24; Chad, n=35)
- Chad: 86%
- Uganda: 54%

Legend: ■ Chad ■ Uganda

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Findings – Quality of Care Assessment

CASES MISCLASSIFIED				
	UGANDA		CHAD	
CLASSIFICATION	CONTROL GROUP n=30	INTERVENTION GROUP n=32	CONTROL GROUP n=35	INTERVENTION GROUP n=35
	(%/n)	(%/n)	(%/n)	(%/n)
Case to be referred without treatment	30% (9)	3% (1)	0% (0)	0% (0)
Case to be referred with chest-in drawing	0% (0)	0% (0)	3% (1)	0% (0)
Case to be referred with fever	13%(4)	6% (2)	3% (1)	0% (0)
Case to be referred with diarrhea	7% (2)	3% (1)	0% (0)	3% (1)
Neonatal case to be referred	0%(0)	3% (1)	0% (0)	0% (0)
Cough/Cold	30% (9)	13% (4)	17% (6)	3% (1)
Pneumonia	0% (0)	6% (2)	23% (8)	6% (2)
Malaria	7% (2)	6% (2)	6% (2)	14% (5)
Non-Malarial Fever	3% (1)	0% (0)	6% (2)	14% (5)
Suspected malaria case	0% (0)	0% (0)	3% (1)	6% (2)
Diarrhea	0% (0)	0% (0)	0% (0)	6% (2)
Moderate Malnutrition	0% (0)	3% (1)	3% (1)	0% (0)
Severe Malnutrition	0% (0)	0% (0)	0% (0)	0% (0)

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Findings – Quality of Care Assessment

CHW inquiry on child presenting with danger signs				
DANGER SIGN QUESTION	**UGANDA**		**CHAD**	
	CONTROL GROUP	**INTERVENTION GROUP**	**CONTROL GROUP**	**INTERVNETION GROUP**
	% (n)	% (n)	% (n)	% (n)
CHW asks if child capable of drinking/breastfeeding	67% (30)	25% (32)	69% (35)	97% (35)
CHW asks if child vomits everything they consume	53% (30)	19% (32)	63% (35)	91% (35)
CHW asks if child has had convulsions	40% (30)	38% (32)	34% (35)	89% (35)
CHW tries to stimulate a child who is sleeping or appears unresponsive/lethargic	100% (11)	0% (1)	20% (5)	NA (NA)
CHW asks if child has been sick for more than 14 days or has had fever for longer than 7 days	27% (30)	50% (32)	51% (35)	77% (35)
CHW checks to see if child has severe chest in-drawing	7% (28)	28% (31)	89% (35)	100% (35)
CHW checks to see if child has swelling of both feet (edema)	27% (30)	34% (32)	80% (35)	69% (35)
CHW measures MUAC (if child between 6 months – 5 years)	85% (27)	73% (30)	100% (33)	100% (29)
If child has danger sign, CHW refers child immediately	0% (1)	NA (NA)	50% (6)	NA (NA)

Findings – Quality of Care Assessment

CHWs who provided correct treatment				
	Uganda		Chad	
Treatment Type	CONTROL GROUP % (n)	INTERVENTION GROUP % (n)	CONTROL GROUP % (n)	INTERVENTION GROUP % (n)
ORS	100% (11)	100% (14)	75% (4)	100% (14)
Zinc	100% (3)	89% (8)	100% (3)	100% (4)
ACT	100% (13)	93% (14)	100% (15)	100% (6)
Amoxicillin	100% (3)	100% (9)	100% (6)	88% (14)

Findings – Focus Group Discussions

ACCEPTABILITY:

- Majority of CHWs felt that the device was broadly accepted by community members, particularly given the immediate diagnosis which they perceived as more reliable than use of a respiratory timer in counting.
- The device helped them to build trust with caretakers
- The device empowered them in explaining diagnoses to caregivers and explain to caregivers why the child does not need antibiotic treatment if only a simple cough was detected
- Caregivers were reassured caregivers that the appropriate diagnosis and treatment was provided when the ChARM tool was used.

Findings – Focus Group Discussions

Use of the device:
- Majority of CHWs reported tying the belt to be a difficult step. They felt the belt was too loose or could too easily slip off.
- Some CHWs reported that the time allotted for the reading which was about 30 seconds, was too short and some missed the results. It was recommended that the display showed the reading for a longer time before it disappeared.
- Some CHWs found the device hard to use when a child was distressed. There were also some challenges reported in positioning the child and selecting the right age group.
- CHWs were disappointed with the battery life. While the device is supposed to be enough for 200 assessments, it was reported as only lasting for 50 assessments. They felt the device could be improved by extending the overall battery life or including a built-in charging system.

Main project learnings

- Overall findings showed that the ChARM device improved CHW's ability to accurately diagnose pneumonia versus cough/cold
- The ChARM tool also helped lessen the pressure on CHWs to provide antibiotics when a child was shown to not have pneumonia, as the results coming from the devise helped the caregivers and community members accept the diagnosis and treatment recommendations.

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Recommendations

Program Implementation

- Improved and more frequent training

- Access and supply of medicines also essential for comprehensive care

- Supportive supervision visits on a monthly basis that include on-the-job training is essential to ensure CHWs are providing correct case management of all three conditions and are asking about/ identifying danger signs

ChARM device specifications

- Improved batter life, belt design and length of displaying RR results

Next steps for the IRC

- **Continued use of ChARM tool in Chad and Uganda** - The IRC teams from both Chad and Uganda are encouraged by the results of this pilot and both teams plan for the CHWs from the intervention group to continue using the devise and will explore options for how to expand the use of the tool to the rest of the CHWs in their programs.

- **Advocacy with MoH in Chad and Uganda** - Both teams are also planning to present the findings and advocate with their respective Ministries of Health for the inclusion of the ChARM tool into the iCCM guidelines for their country.

- **Identify other countries for use of the ChARM tool** - At the global level, the IRC is interested to explore opportunities for how to expand the use of the ChARM tool beyond Chad and Uganda. We will disseminate the findings to IRC health programs around the world and identify country programs that might be interested to incorporate the use of the tool into their iCCM program.

- **External presentations** - Identify opportunities to present the findings from the evaluation to external audiences that are interested in childhood pneumonia, iCCM and community health.

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