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Can community health workers in Ethiopia correctly adhere to iCCM algorithms for assessing and classifying under five children for symptoms of pneumonia using a new respiratory rate diagnostic aid?

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KEY MESSAGES

- Health extension workers (HEWs) in Ethiopia can correctly adhere to iCCM algorithms for assessing and classifying under five (U5) children for symptoms of pneumonia using the Children's Respiration Monitor device.
- Length of time as a qualified HEW, and levels of prior training and supervision, do not affect HEWs' ability to correctly adhere to iCCM algorithms when using Children's Respiration Monitor device after two months of using the device at the health post.
- Caregivers, HEWs and first-level health facility workers (FLHFWs) were accepting of the Children's Respiration Monitor device.

Introduction

- In 2016, pneumonia accounted for 16 percent of under five deaths, making it the leading infectious cause of death worldwide[1].
- The current methods for diagnosing pneumonia in low-income settings depend on the health worker manually counting the child's respiratory rate (RR) over one minute.
- Pneumonia is both under-diagnosed and inappropriately treated.
- Improved tools to support frontline health workers to accurately diagnose symptoms of pneumonia are needed.

1 WHO and Maternal and Child Epidemiology Estimation Group (MCEE), 2017

Methods

The Acute Respiratory Infection Diagnostic Aid (ARIDA) acceptability study aims to understand if HEWs in Ethiopia can correctly adhere to integrated community case management (iCCM) algorithms to assess and classify children under five using a new automated RR counter – the Philips Children's Respiration Monitor (ChARM) device. HEW adherence to device manufacturer instructions was also measured.

HEWs were trained to use the ChARM device and received refresher training on iCCM. HEWs were twice observed assessing sick children using a ChARM device, once after initial training, and again after two months of routinely using the device in their health post.

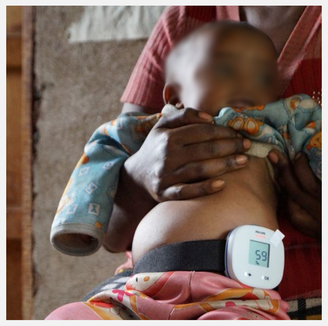
Baseline data on when HEWs last received routine iCCM refresher training and supportive supervision, and on their number of years as a qualified HEW, were collected.

HEWs, FLHFWs and caregivers of children under five participated in semi-structured interviews, designed to understand their perceptions of ChARM and the barriers they faced while using the device.

Results

Quantitative findings:

- A total of 130 HEWs participated in the study. All HEWs were literate and had completed secondary school plus at least one year of tertiary training. Mean number of years qualified as a HEW was eight years (standard deviation = 4.5 years).
- A total of 337 children, of which 72 (21 percent) were less than two months old, were evaluated by the HEW after two months routinely using the ChARM device.
- After two months, HEWs completed all eight assessment and classification steps correctly with ChARM for 74 percent of child evaluations (table 1). This represents a 18.6 percent increase from when they were assessed immediately after training ($p<0.001$).
  - HEWs correctly adhered to device manufacturer instructions (stages 1 to 3) for 76.9 percent of child evaluations
  - HEWs correctly adhered to WHO guidelines (stages 4 to 8) for 84.7 percent of child evaluations
- HEWs could get a reading within three attempts, more than 99 percent of the time, and on the first attempt, 92 percent of the time.
- The mean time taken to get a reading was 197 seconds (from when the HEW strapped on the device to when a RR reading was displayed, inclusive of up to three attempts).
- A total of 933 (95.5 percent) under five pneumonia assessments were completed with ChARM at 60 health posts during the two months of routine use.
- There was no association between time since i) a HEW's last routine iCCM integrated refresher training; ii) a HEW's last routine supervision; or iii) qualification as a HEW, and her ability to correctly adhere to iCCM algorithms with ChARM after two months of routine use ($p>0.05$).



Child being assessed by a HEW using the Philips ChARM device, Ethiopia

Table 1: Number and proportion of child evaluation stages correctly performed by HEW with ChARM after two months of routine use

Child evaluation stage	n	%	95% CI
1. Correct child position	273	81.0	76.8-85.2
2. Correct ChARM device position	319	94.7	92.3-97.1
3. Correct ChARM belt position	337	100.0	n/a
4. Correct age group selected	332	98.5	97.2-99.8
5. Child calm before assessment	326	96.7	94.8-98.6
6. Child not eating/feeding during assessment	336	99.7	99.1-1.0
7. Child calm during assessment	332	98.5	97.2-99.8
8. Correct classification based on device reading	333	98.8	97.7-1.0
9. Correct assessment and classification (all stages 1-8)	250	74.2	69.5-78.9
10. Correct treatment decision (did the HEW make the right decision to treat the child?)	331	99.1	98.1-1.0

Qualitative findings:

A total of 14 HEWs and 14 caregivers completed semi-structured interviews.

- Caregivers were accepting of the device, reporting that they would be comfortable for it to be used on their children again and that they would recommend it to others.
- There was demand among frontline health workers for the device to be available for use in the future; they were relieved that the device was found to provide a consistent reading when they tested it against their standard practice device.
- Frontline health workers found it easy to count RR and classify cases using the device, but struggled to adjust its belt, especially on older children.
- HEWs felt that the availability of the ChARM device had encouraged caregivers to visit the health post.

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