An innovative, low-cost tool for a more efficient weight-for-height/length (WHZ/WLZ) assessment

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Introduction

Early identification and treatment of wasting is an important element in the reduction of childhood mortality and long-term negative health impacts, including stunting. Wasting is diagnosed in children through weight-for-height/length z-score (WHZ/ WLZ) assessments and by measuring mid-upper arm circumference (MUAC). WHZ/WLZ assessment requires three steps, including taking weight and height/ length measurements and looking up the results in tables/charts. Each step is time-consuming and prone to error. For this reason, the World Health Organization does not recommend the use of WHZ/WLZ for the assessment of child nutrition status at the community level.

Some countries, such as Ethiopia, have effectively decentralised management of acute malnutrition services to sites closer to communities. In Ethiopia over 90% of these sites use MUAC to diagnose wasting. MUAC and WHZ/WLZ assessments, however, identify two distinct groups of patients at risk of death and the overlap between the two indicators is very low. For this reason, scholars are asking for innovative solutions that simplify WHZ/WLZ assessments. In response, a new tool has been developed that aims to address some of these drawbacks, thereby minimising errors in WHZ/WLZ assessments and potentially saving health worker time and energy.

The new tool

The new method involves a decision-making calibrated-chart on a height board in place of the usual measuring tape. This chart, called a Y's chart, reduces the steps needed for a WHZ/WLZ assessment from three to two by avoiding the need for separate reference materials (Figure 1).

New height boards were produced with grooved spaces to post the calibrated charts. As an alternative, the graduated charts were also produced as stickers to be attached to existing height boards. As the new charts also have linear measurement markings in centimeters, the placement of the stickers on the existing boards was not difficult when done with due care.

Field testing

To measure potential gains of the new tool, field tests were conducted by four regional state health bureaus in collaboration with USAID Transform: Primary Health Care project between December 2017 and December 2018. A half day's practical training was provided to a total of 16 health workers (clinical nurses and health officers), after which half used the standard method and half used the new tool to measure WHZ/WLZ in a group of 195 children. 'Time saved' and 'proportion of errors committed' were measured and compared between groups. Four community health extension workers (HEWs) were also trained on the new method and conducted WHZ assessments as a separate group. A pair of anthropometry experts reassessed the same children as normal, with moderate acute malnutrition (MAM) or with severe acute malnutrition (SAM) and their assessment was taken as gold standard. The amount of time spent on each WHZ assessment was measured by data collectors.

Results showed that the assessment took an average of 77 seconds to conduct with the standard method and 44 seconds with the new method. A total of 154 children were reassessed by experts. The proportion of errors committed by health workers who used the standard method versus new method was 11.6% and 4.4% respectively. HEWs who used the new method committed 7.3 % errors in classifying children as normal, MAM and SAM.

Conclusion and recommendation

The new tool was found to be more efficient, saving 33 seconds per assessment (p < 0.001). This is a 43% reduction of time and energy and is a significant gain, especially for busy health facilities. The new tool also produced less errors. However, as prevalence of malnutrition is low, a larger sample study is needed to make definitive conclusions. A randomised clinical trial is currently underway (clinicaltrial.gov, ID: NCT03780348) to investigate potential gains in accuracy. The new tool was also effectively used by community HEWS, indicating its potential for community-level use.

The health bureaus in the four most populous regional states in Ethiopia have endorsed the tool and it is currently in use in 100 health facilities. The feedback from health workers in these facilities is consistently positive. Multi-country testing for its introduction into global practices is recommended.

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Figure 1

Venn diagram visualising discrepancies between cGAM, GAM per WHZ and GAM per MUAC

Existing method - *height board with measuring tape*

New method - *height board with a decision-making chart (Y's chart)*

Steps with the existing method

Step 1 Measure height or length in standard postion
Step 2 Measure weight
Step 3 Check reference charts or curves to find WHZ/WLZ score

Steps with the new method

Step 1 Measure weight
Step 2 Check WHZ/WLZ score using Y's chart on the height /length board after positioning the child as per the standard