South African Journal of Clinical Nutrition 2018; 31(2):4-5

SAJCN
ISSN 1607-0658 EISSN 2221-1268

EDITORIAL

Conventional Indicators of the Burden of Young Child Malnutrition: time for a rethink?

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"What you cannot measure, you cannot improve upon."
Lord Kelvin

The world has moved on from the Millennium Development Goals (MDGs) era to the next phase in global development, namely, the Sustainable Development Goals (SDGs). The SDGs have multiple targets and indicators, among which Target 2.2 relates to measurement of stunting, wasting and overweight in children under five. The MDGs had stunting and underweight as indicators to be measured to assess progress in addressing child malnutrition. In 2012, the World Health Assembly Resolution 65.6 endorsed a *Comprehensive implementation plan on maternal, infant and young child nutrition*, which specified a set of six global nutrition targets that by 2025 aim to, among others, achieve a 40% reduction in the number of children who are stunted, reduce and maintain childhood wasting to < 5%, and ensure there is no increase in childhood overweight.[1]

The UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates (2018) provide current information based on these three indicators.[2] Estimates are generated using a country-level data set that is mainly comprised of estimates from nationally representative household surveys, e.g. the DHS (Demographic and Health Survey) and MICS (Multiple Cluster Survey). Interestingly, in the context of the topic of this editorial, the report notes that "Some children suffer from *more than one form of malnutrition* (own emphasis) – such as **stunting and overweight** or **stunting and wasting**. There are currently no joint global or regional estimates for these combined conditions." Issues such as the quality and currency of data on child malnutrition are paramount in the context of identifying levels and trends, for formulating appropriate responses to the data findings, and for global and regional comparisons.

The study by Ziba et al. in this issue of the journal raises questions about the utility of conventional indicators, such as stunting, wasting and underweight, in measuring the prevalence of undernutrition in young children.[3] While each of these indicators reflects distinct biological processes, what they cannot reflect singly is when children experience a combination of, or multiple anthropometric failures (MAFs) or deficits.[4]

The Composite Index of Anthropometric Failure (CIAF), first proposed by the economist Svedburg in 2000[5] and modified by Nandy in 2005,[6] incorporates the three forms of undernutrition, thus providing a single aggregate figure of all undernourished children in a population. **(Table 1)** The aggregate levels of undernutrition using the CIAF are usually greater than shown by the conventional indicators of stunting, wasting and underweight.[7] The CIAF, with its sub-groupings, can also be disaggregated to show the underlying pattern of undernutrition in children in more detail, allowing relevant interventions or actions to be implemented.[4] Children with MAFs (overlapping or multiple anthropometric failures) are at highest risk for morbidity and mortality, compared with those with single anthropometric failure.[8,9] The CIAF is able to provide a single-figure, aggregate estimate of the overall burden of undernutrition among young children in a population. On the other hand, the disaggregated CIAF

Table 1 CIAF (Composite index of anthropometric failure) groups among children (%)

Group	Description	Wasting	Stunting	Underweight
A	**No failure**	No	No	No
B	**Wasting only**	Yes	No	No
C	**Wasting and underweight**	Yes	No	Yes
D	**Wasting, stunting and underweight**	Yes	Yes	Yes
E	**Stunting and underweight**	No	Yes	Yes
F	**Stunting only**	No	Yes	No
Y	**Underweight only**	No	No	Yes
CIAF	**100% minus A**			

Adapted from Nandy et al. 2005

allows for more nuanced assessments of the relationship between undernutrition, morbidity and poverty.[8]

Ziba et al. mention meeting international targets in nutrition, which currently do not provide information on CIAF. The researchers performed secondary analysis on data from the Malawi Demographic and Health Survey (MDHS) from 1992, 2000, 2004, and 2010. It is unfortunate that the authors did not include data from the MDHS 2015-16 to provide a current picture of undernutrition in Malawi. The MDHS 2015-16 reference (number 12), together with MICS 2012 (reference number 11), was used to emphasise the high prevalence of stunting as the major form of undernutrition, without providing details on the prevalence found in these surveys.

The data for the surveys up to 2004 would have been based on the 'old' WHO/NCHS reference. Importantly, the authors confirm that the WHO 2006 Growth Standard was used to calculate the various z-scores for all the MDHS data. There was very little discussion about the trends in the MAF groups, which clearly show a decreasing trend over subsequent surveys, unlike the single indicators of stunting, wasting, and underweight. Ziba et al. missed the opportunity to discuss the results in more depth and in so doing, did not do justice to their findings. For example, although representing only two percentage points, there was a 61% decrease in the group with wasting, stunting, and underweight, from 1992 to 2010. Similarly, there was a 45% decrease in the stunting and underweight group.

There are, however, opportunities for further analysis of the MDHS data available to the researchers. Since data on background education and wealth characteristics would be available to the researchers, associations between CIAF, MAF and single groupings can be described, as in Vollmer[10] and Nandy.[4] The authors also referred to the study by Bose & Mandal 2010[11] as an example of a local study in India that showed CIAF to be higher than underweight. The latter study, however, was primarily about the establishment of three new indices of childhood malnutrition, viz. a Stunting Index, a Wasting Index, and an Underweight Index. The proposed indices could supplement the conventional measures of undernutrition. This approach could have been applied to and tested in the Malawi DHS data.

The authors noted that their study on CIAF was the first conducted in Malawi. CIAF, however, has been applied in numerous studies worldwide, including Africa, Latin America and Asia.[4,6-11] The real limitation of CIAF of not including children who are overweight or obese was nonetheless highlighted by Ziba et al. This is particularly relevant for South Africa, where the prevalence of overweight children has almost doubled from SADHS 2003 (7.5%) to SADHS 2016 (13.3%).

What to do then in light of the proposal in support of CIAF? Do we ditch the conventional indicators of undernutrition and adopt the CIAF? The answer is no; there should be more studies looking at the associations between the CIAF and the single and MAFs and morbidity, as well as testing the addition of overweight indicators and stunting and wasting, as per Global Nutrition Targets and the UNICEF/WHO/World Bank database, which noted that no composite indicator for stunting and overweight and stunting and wasting was currently available.[1,2]

Given the ready availability of anthropometric data from household surveys, the CIAF is likely to be used much more frequently. It provides researchers, programme managers and planners with another tool to assess change and see if progress has been made.[8] The research community in South Africa and the rest of Africa is encouraged to use the opportunity to use the CIAF in future research. There is no doubt that the CIAF in aggregate and disaggregated forms has a role to play when estimating the burden of childhood undernutrition. The relation between CIAF and young child *overnutrition*, and between child and maternal nutrition (anthropometric status) using CIAF, needs to be pursued.

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