Maternal & Child Nutrition

DOI: 10.1111/mcn.12107

Letter to the Editor

Reply to Correspondence: is the strength of association between indicators of dietary quality and the nutritional status of children being underestimated?

To the Editors,

We are grateful to Thorne-Lyman *et al*. (2014) for the insightful comments in response to the Jones *et al*. (2014) article. We largely agree with observations highlighting important limitations of dietary data drawn from 24-h recall methods and take the opportunity to augment the discussion of the important question posed regarding the potential underestimation of the associations between indicators of dietary quality and child nutritional status.

Thorne-Lyman *et al*. (2014) suggest in particular that low statistical power resulting from random within-person error introduced through the use of single pass 24-h recall data may explain the statistically non-significant relationships observed between the World Health Organization (WHO) minimum dietary diversity (MDD) indicator and child stunting in the recent article by Jones *et al*. (2014). They further suggest that this within-person error could be corrected for in analyses if at least one additional day of data on the food group diversity of young child diets were collected.

We agree with this assertion and suggest also that these challenges are not limited to random within-person error associated with data derived from 24-h recalls. Taking the MDD indicator as an example, we highlight in the Jones *et al*. (2014) article that this indicator lacks specificity with respect to the micronutrient adequacy of diets (i.e. it may commonly misclassify adequate diets as inadequate). Therefore, even with sufficient statistical power, classifying the adequacy of diets using a binary categorical variable may not allow for sufficient accuracy when using regression analysis to examine the relationship between diet diversity and nutrition-related health outcomes (Royston *et al*. 2006). Investing the effort and expense to collect replicate measurements of child dietary diversity will reduce within-person error and can provide a more accurate exposure assessment. Having done this, however, it would be disadvantageous to limit the analysis by using an indicator that lacks specificity and therefore cannot take full advantage of the additional information collected from those replicate measurements.

While the WHO indicators provide practitioners, researchers and decision-makers with easy-to-use metrics to draw attention to disparities in child feeding practices, they have specific limitations in assessing diet-health relationships. In highlighting the need to be clear about the use of data, Beaton (1994), in the article cited by Thorne-Lyman *et al*. (2014), points out that error in dietary assessment may have different consequences depending on the analytic question at hand. In regression analyses, for example, random error resulting from within-person variation may alter both the intercept of an observed relationship and the slope (Beaton 1994). However, if one is only interested in comparing group means (e.g. comparing dietary diversity across countries or subgroups within countries), random error will not bias the relationship, but will rather simply decrease statistical power to detect a difference (Beaton 1994). The WHO infant and young child feeding (IYCF) indicators are especially well suited for this latter purpose, in which case, the random within-person error introduced through single-day 24-h food group recall is not a serious concern in sufficiently large samples.

In examining the relationship between diet and health on the other hand, random error is a threat to the actual observed relationship. It is not clear that the MDD indicator is the appropriate metric for representing dietary data collected using the replicate measurements needed for addressing this within-person error. Indeed, future research efforts and discussions would be well directed towards identifying the most appropriate indicators, especially those that

are food based, for the purpose of examining diet–health relationships in different contexts.

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