Reviewer’s report

Title: Determinants of Underweight, Stunting and Wasting among Schoolchildren

Version: 4  Date: 7 July 2014

Reviewer: Susan Tanner

Reviewer’s report:

- Major Compulsory Revisions

This study draws on a large sample of schoolchildren in Southern Ethiopia to assess relationships between childhood undernutrition and an impressively wide variety of potential correlates. Overall, the manuscript presents interesting associations that could contribute to undernutrition in schoolchildren in Southern Ethiopia. My suggestions for the manuscript are related to organization and clear presentation of the results and limitations.

1. First, the magnitude of the problem of undernutrition is difficult to assess because there is not a clear presentation of the anthropometric data (height, weight, BMI, and the appropriate z-score calculation averages and SD). Also, please include how many children had multiple parasite species and discuss if there is significant variation across the three selected schools with respect to any of the key variables.

2. The methods state that the 24 hour recall was done with the children’s parents. Please clarify that the parents were reporting for their children. Was there an attempt to do 24 hour recall with the older children? How accurate is parent’s recall for the older children?

3. Is helminthiasis (assuming it is the presence/absence of any infection) in the same model as the other three helminth variables (Ascariasis, hookworm, Trichuriasis)? Assuming that helminthiasis is the presence of at least one of the helminth species, is the variable helminthiasis highly correlated with the most common infection Ascariasis? It might be useful to include helminthiasis in a model without the other 3 species to examine the general relation with undernutrition and minimize correlated variables. The discussion of the univariatie analyses examining the associations between low weight for age and helminth infections (third paragraph in results) is confusing and appears to contradict the results of the multivariate logistic regression model. Please clarify.

4. The limitations of the study should be discussed. These might include that this is a cross-sectional study which limits the ability to discuss causation, any error in recall or the interview data, etc. Additionally, the overall discussion section emphasizes the key finding of the study. Some of the findings, such as maternal education and household food insecurity, are consistent across several models and this may deserve discussion, especially because of the variables are categorical and not all categories have a consistent relationship with the outcome.
variable. While it is valuable to list how this study’s results compare to research in other regions, the authors could also discuss why the results are consistent or inconsistent with this other research or how comparable and generalizable the findings of this study are to the larger problem of undernutrition in school children.

- Minor Essential Revisions

1. Abstract: first two sentences of results. Because the reported adjusted odds ratios are in comparison to another category in the group, their meaning is slightly confusing here in the abstract. Please clarify the wording, especially with respect to the maternal education variable and stunting as higher maternal education (compared to no formal education) is associated with lower odds of child stunting. Similar wording issue with underweight.

2. Methods: Please clarify the anthropometric terminology and include a clear definition of each of the indicators of undernutrition (e.g. wasting, stunting). Low BMI-for-age should be referred to as thinness.

3. 2. Results, Page 9, second paragraph of results: There are several indices presented in the results that are not described in the methods or results such as availability of health service, health seeking behavior, and personal hygiene score. Additionally, the definition of adequate Calorie and Carbohydrate intake should be included.

4. The sample sizes presented in Table 2 are smaller than the full sample, presumably because this relies on low weight-for-age. Please clarify.

5. Results, page 10: Overall, the results section would benefit from indicting the comparison group in the discussion of logistic regression results. For example, in the first paragraph, maternal education and household food insecurity are both categorical variables and the odds ratios are with respect to the excluded category. That relationship could be more clearly presented in the results and discussion.

6. Results: 5th paragraph, top of page 10. This paragraph should indicate that they are discussing the multivariate regression model for underweight. Additionally, the first sentence is grammatically unclear and could be more precise. Might include “after controlling for other variables in the model”

7. Discussion, Last sentence of first paragraph is not clear.

8. p. 13, 2nd and 3rd paragraphs. Please include the names of the authors instead of the number of the reference [35, 30, 37] in the text.

9. p. 13, end of the first paragraph. Please add a reference and discussion of the World Bank statistics that are mentioned. Additionally, the manuscript may overstate the lack of research in the area with respect to household food security/insecurity and nutritional status. While it is likely true that little research has focused on the 7-14 year age category, there is research on undernutrition in
younger children and food insecurity in general in the region that may be useful to discuss. In addition to other scholars, research by D. Ali and colleagues (doi: 10.3945/jn.113.175182) or C. Hadley and colleagues (doi: 10.1002/ajpa.21463) might be useful.

10. Table 2 has the number 1 to indicate the comparison group for some variables but not all (e.g. CHO intake has a 1 for the adjusted OR of Adequate intake, but not the Crude OR). Additionally, some confidence intervals are reported to 2 decimal places, while others have only one decimal place. Please correct.

- Discretionary Revisions

1. Are the results consistent if the continuous z-score values are used as the dependent variables in a multiple regression model instead of the logistic regression models with bivariate indicators of underweight, stunting, and low BMI for age?

2. Methods, P. 7, last paragraph. Please include reference for NCHS data.

3. Discussion, Last paragraph of the first page. Do the authors have information suggesting that T. trichurias represents a chronic infestation? Is it more likely to be chronic than the other infections?

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Not suitable for publication unless extensively edited

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests