Author's response to reviews

Title: Food insecurity, school absenteeism and educational attainment of adolescents in southwest Ethiopia: a longitudinal study

Authors:

Tefera Belachew (tefera_belachew@yahoo.com)
Craig Hadley (chadley@emory.edu)
David Lindstrom (david_lindstrom_1@brown.edu)
Abebe Gebremariam (abebe_gebremariam@yahoo.com)
Carl Lachat (Clachat@itg.be)
Patrick Kolsteren (pkolsteren@itg.be)

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Author's response to reviews: see over
Subject: Submitting the revised version of our manuscript # MS:1711078239481808

Dear Sirs,

Thank you for communicating us the reviewers’ comments on our manuscript entitled “Food insecurity, school absenteeism and educational attainment of adolescents in southwest Ethiopia: a longitudinal study”. We have revised the manuscript addressing all comments of both reviewers Point by point. Attached you will find our response letter, detailing our responses and modifications made. Clarifications were also included in the text of the paper for all the changes that were made in response to the reviewer’s comments.

As suggested, we also included a figure title and legend section after the reference list and removed the key words and running title. The manuscript is revised to conform to the journal style and the changes made are highlighted in the text of the manuscript.

Sincerely,

Prof. Tefera Belachew, Corresponding author
Response to Reviewers

General
We formatted the manuscript according to the Journal styles and:

• Included a figure title and legend section after the reference list.
• Removed the key words and running title.

Response to Reviewer 1

Dear reviewer, thank you for the constructive and critical comments. We have addressed all the comments as follows:

Minor Essential Revisions
On p. 3, “overtime” should be “over time”. Although generally the writing is good, there are other edits of this kind to the writing that should be made throughout the manuscript.

All the editorial problems are addressed throughout the manuscript and various sections were edited to ensure clarity. The revisions were indicated in the text.

On Page 3, “Overtime” was changed by “over time”

Neither the Methods section nor the tables (2 and 3) make clear what variables were controlled in the multiple regression models. This should be stated in the Methods section and the adjusted variables should be listed in a note at the bottom of Tables 2 and 3. Furthermore, it is not clear if the results for each listed variable in these two tables are adjusted for the other variables listed in the table (i.e., each table represents results for one regression model) or if these are results from a regression model for each variable listed.

In the methods section and in the results, the variables adjusted for in the multiple regression models were indicated. In the results section, the outputs of bivariate analyses and from multivariable analyses were clearly indicated as per the comment (Lines 231 and 140). In the footnotes of Tables 2 & 3, the fact that the values in the tables are adjusted is indicated as commented (lines 545 and line 551).

It is stated that “Normality of the data was assessed visually using a P-P plot for all numerical variables” but it is not stated if the dependent variable in the linear regression (highest grade completed) was normal.

The fact that the normality of the dependent variable (the highest grade completed) was checked for normality was indicated in the text of the manuscript per the comment. The normality was checked using P-P plot as well. We have indicated that the dependent variable was normally distributed in the methods as commented (line 198).
Response to Reviewer 2

Thank you for the constructive and critical comments. We have addressed all your comments point by point as follows:

Major Compulsory Revisions

1. Given that food insecurity is the focus of the article, some brief details on the instrument used to assess it at the level of the household and adolescents, who it was administered to at each level, how the variables were coded, etc., are essential for the interpretation of the manuscript as a standalone piece of research (rather than simply referring to a prior publication).

   The measurement of household food insecurity and adolescent food insecurity was included in the methods of the manuscript based on the comment (Lines 137-158).

2. What was the time frame for the food security measure? Does it match the follow up period of one year? Do most participants in the study experience chronic food insecurity punctuated by acute periods of hunger? What is being assessed by the scale and how might this affect the results?

   The time frame for assessment of food insecurity was indicated in the methods and the discussion of the manuscript to be the last three months before the survey. Both the household head (for household food insecurity) and the adolescent respondent (for adolescent food insecurity) were asked whether they had experienced the problems during the past three months. However the total survey period incorporated two seasons: the rainy season (relatively constrained) and the spring season (better in terms of food security). The scale was used to assess acute food insecurity as it covered only the last three months. This has been emphasized in the discussion (Lines 141, 150 & 354).

3. In the background and discussion sections, please identify the context for the literature that is being cited. Most, if not all, of the papers used to make the case that food insecurity has negative implications for development and academic achievement are from the U.S. – it would be helpful to indicate that studies in developed/higher-income countries suggest this relationship whereas this issue has not been explored in developing countries or at least not in this study area (any data from lower-income countries on this issue that could help make the case?). It would also be helpful to distinguish between cross-sectional studies and longitudinal studies that support a causal relationship in describing the literature from the U.S. and other developed countries.

   In the background and discussion sections, the context for the literature that is being cited was identified mentioning fact that studies in developed/higher-income countries suggest this relationship whereas this issue has not been explored in developing countries most especially using adolescents’ own experience of food insecurity. The fact that there are no studies which documented the issues was also indicated. Distinction was also made between cross-sectional studies and longitudinal studies (Line 91).
4. Still on the issue of context, the authors mention food stamps and breakfast programs in the discussion as being positively associated with academic achievement, again citing U.S. literature. What is the relevance of these programs to the Ethiopian context? Are there any similar programs? What specific recommendations would the authors make in terms of program or policy implications based on their findings?

The fact that school feeding programs are positively associated with academic achievement was indicated using more references in the discussion. The relevance of food stamps and breakfast programs to the Ethiopian context was discussed with reference to the existing programs in the country. Specific recommendations in terms of program or policy implications were also forwarded based on their findings in the discussion (Lines 340-340).

5. The last few sentences in the first paragraph of the background (suggesting that the mechanisms by which food insecurity affects development is through reduced intake of nutrients) are overly strong and not supported by the available literature. A number of studies have shown that children’s intakes are less affected than are adults in food-insecure households. Further, there are other mechanisms by which food insecurity could affect development, such as stress. This is an area that needs much more research given that how children experience food insecurity is a relatively new area of inquiry.

The relationship between household food insecurity children’s intakes was discussed in the light of literature that had documented the fact that children are less affected than are adults in food-insecure households. Other mechanisms by which food insecurity could affect development, such as stress were also emphasized in background (lines 85-90) and in the discussion (Lines 290-310) using literature.

6. A very broad definition of food insecurity is given – it seems unlikely that the food security scale used measures all of the aspects included in the FAO definition. Please provide a more precise definition that better corresponds to the scale, or provide examples of the questions included in the scale to convey what was actually assessed. If a definition of food insecurity is included, it would be helpful to include it earlier in the paper.

To show how food security was measured, the questions included both in the household and adolescent food security scales and how food insecurity was assessed was included in the text of the manuscript. The details are indicated in our response to the first question above (Lines 137-158).

7. Please explain the rationale for the inclusion of both bivariate and multivariate results. The presentation of the bivariate and multivariate findings is somewhat confusing because the two sets of findings are not clearly distinguished and how they should be interpreted is not made clear. For example, the first paragraph on page 6 makes the point that gender is a factor in absenteeism; however, this effect did not persist in the multivariate model, suggesting that some other factor (working rather than attending school?) accounts for this association. Clarifying which results are from which model
could help the reader to interpret the findings and also lead to a more thorough discussion of the results, e.g., why this gender effect was seen in the bivariate but not the multivariate model.

The rationale for the inclusion of both bivariate and multivariate results was explained in the text of the manuscript, methods section (lines 193-94). The fact that the explanatory variables were measured one year before the dependent variable (educational attainment) was included in the methods (Lines 163 and 173). The presentation of the bivariate and multivariate results is clarified by clearly distinguishing and how they should be interpreted both in the methods and the results. Explanation was given on why the gender effect on school absenteeism was seen in the bivariate but not the multivariate model was also explained in the discussion (Line 318).

8. The discussion needs more thorough referencing and is somewhat repetitive. It would be useful if the authors discussed potential mechanisms by which food insecurity affects development, hypotheses regarding differential gender effects (perhaps citing other literature that suggests similar findings – e.g., Cook & Frank, Ann NY Acad Sci 2008 + literature from lower-income countries?), and specific recommendations for action to improve food security as noted above.

More references were used in the discussion and repetitive explanations were trimmed. The potential mechanisms by which food insecurity affects development and school attainment were explained in the discussion using the suggested references and more other references. Specific recommendations for actions to improve food insecurity were also indicated in the discussion (Lines 290-310).

Minor Essential Revisions

9. It would be helpful to describe MDG2 when first noted in the background.

MDG2 was described in the background when is first noted (Line 106).

10. In the hypothesis, the authors note that they are looking at frequency of school absenteeism – but isn’t the variable in the regression model actually never vs. ever rather than a frequency measure?

The hypothesis was corrected to state ever school absenteeism as follows: “We hypothesized that higher proportion of food insecure adolescents in southwest Ethiopia would have school absenteeism and lower educational attainment compared with their food secure peers.” (Lines 106-108)

11. The manuscript would be helped by some statistics about the extent of food insecurity in Ethiopia beyond indicating that it is a common problem. How do the rates of food insecurity observed in this sample compare to other available statistics? A reference for rainy/hunger season would also be helpful.
Statistics about the extent of food insecurity in Oromia region (the region where the study area is located) was included. Comparison of the rates of food insecurity observed in this sample and other available Statistics was made (Line 357). A reference for rainy/hunger season was also given in the discussion (Lines 356).

12. What is the rationale for the covariates included in the multivariate models? How/when were the covariates measured?

The rationale for inclusion of the covariates in the multivariate models was explained in the methods. The covariates were included in the models because they had significant association with the dependent variable in the bivariate analyses (Line 194). The covariates were measured on the first round survey that was carried out one year before the assessment of educational attainment (highest grade completed). This was indicated in the manuscript (Lines 163 and 173).

13. What are the implications of including both adolescent and household food insecurity in the models? Does the household measure not assess any experiences of food insecurity at the level of children in the household? Are experiences of food insecurity at these different levels hypothesized to affect child development in different ways or to differing degrees?

The implications of including both adolescent and household food insecurity in the models were discussed. Although the household measure of food insecurity assesses experiences of food insecurity at the level of children in the household, the responses were given by the head of the household. Some reports also show that household food insecurity does not necessarily lead to adolescent food insecurity as there is intra-household buffering of adolescents by children. Co-linearity between household food insecurity and adolescent food insecurity was checked (the highest Variance inflation factor =1.08) and correlation coefficient between household food insecurity and adolescent food insecurity is 0.2 indicating no co-linearity.

14. Unclear why the sample characteristics are given by school absenteeism rather than by food insecurity, which is the explanatory variable of interest in the paper.

The sample characteristics were given by school absenteeism rather than by food insecurity, because, school absenteeism is used also as a dependent variable. The analysis was to show whether food insecurity predicts school absenteeism both on the bivariate and multivariable analyses. So, we think the way it is presented is better. However, based on the comment we have added the differences in the average grades completed and primary school completion rate by the food security status both in the results (Lines 226-231) and in the discussion (Lines 257-259).

15. Any other limitations besides use of only one measure of educational attainment? E.g., self-reported measures, misclassification of food security status, etc.?
Limitations including use of self-reported measures, misclassification of food security status were included in the discussion (Lines 351-366).

16. Please note typo in label in Figure 1

The typo in label of Figure 1 corrected.

**Discretionary Revisions**

17. It would help with interpretation to explain how the values for highest grade completed should be interpreted. Does 6.2 among non-absentees mean 6 years of schooling on average? What is the average for the population?

Explanations on how the values for highest grade completed should be interpreted were incorporated in the text of the manuscript. The highest grade completed of 6.2 among non-absentees mean six completed grades of schooling on average. The proportion of food insecure adolescents who completed primary education was 24.1% while it was 31.5% for food secures. The fact that this lower compared to the national value for the year 2006/7 was indicated in the discussion (Lines 257-259).

18. Unclear how illegitimate absences were captured in contrast to ‘legitimate’ absences.

The definition of illegitimate absence in contrast to ‘legitimate’ absence was made in the text. Illegitimate absence was defined to be absence due to reasons others than the formal school closure days (due to either national holidays or religious days for which the school is formally closed) (Lines 165-67).