**Author’s response to reviews**

**Title:** Adolescent pregnancy and linear growth of infants: A birth cohort study in rural Ethiopia

**Authors:**
Abdulhalik Workicho (abdulhalikw@gmail.com)
Tefera Belachew (teferabelachew@gmail.com)
Alemayehu Argaw (yemariamwork2@gmail.com)
Shibani Ghosh (Shibani.Ghosh@tufts.edu)
Meghan Kershaw (Meghan.Kershaw@tufts.edu)
Carl Lachat (carl.lachat@ugent.be)
Patrick Kolsteren (Patrick.Kolsteren@ugent.be)

**Version:** 2  **Date:** 20 Feb 2019

**Author’s response to reviews:**

Response to reviewers

we would like to thank the reviewers for your time in reading the manuscript and providing us important feedback. Your inputs have significantly improved the manuscript. We also have learned a lot while addressing your questions. We have tried to address the questions point by point as described below. The changes we made based on your suggestions are highlighted in the revised manuscript.

Responses to reviewer 1

- Reporting bonferroni corrected p-value: we would like to thank the reviewers for this important feedback. We have revised the analysis by applying two important procedures. One is we have limited the number of variables included in the regression model by removing those which we think have meditational role than confounding effect. We have also considered adjustment of the p-values for multiple testing which has been indicated using astics in the tables. However, since bonferroni correction is very conservative, we have applied the Benjamin-Hochberg method to control for family wise error rate in multiple testing (https://www.jstor.org/stable/2346101?seq=1#metadata_info_tab_contents).
  Based on this revised analysis, discussion of the results is also edited and changes are highlighted.
• Reporting results of other statistical models: thank you for this important suggestion. As we have described in the manuscript, we have considered different models (linear, quadratic and restricted cubic spline models) for better fitting our data by comparing the AIC and BIC estimates. Finally both the graphical presentation of the growth trajectory and the AIC and BIC estimates indicated for us to choose the quadratic model. The results of all the models we have checked are presented in the supplemental table.

• Replacing the term baseline with the age of an infant: thank you for the suggestion and we have edited this accordingly in the revised manuscript. The changes are also highlighted

Responses to reviewer 2

Title “Since your research only done in single region ,so avoid Ethiopia from your title”: thank you for your suggestion and we have edited the title accordingly and it appears as “Adolescent pregnancy and linear growth of infants: A birth cohort study in rural Ethiopia

Abstract line 23 & 25 grammar error: we thank the reviewers for their comment and the statement is revised as “Evidences indicate that the risk of linear growth faltering is higher among children born from young mothers. Although such findings have been documented in various studies, they mainly originate from cross-sectional data and demographic and health surveys…..”

Line 46-51 recommendation: thank you for your insightful feedback and we have revised the recommendation accordingly and it appears as “Young maternal age had a significant negative association with LAZ score of infants at birth while its association over time was not influential on their linear growth. The fact that wide spread socio economic and environmental inequalities exist among mothers of all ages may have contributed to the non-significant association between young maternal age and linear growth faltering of infants. This leaves an opportunity to develop comprehensive interventions targeting for the infants to attain optimal catch-up growth.” In the revised manuscript.

How adolescent pregnancy could be A key word?: we thank the reviewers for this question. we included “adolescent pregnancy” as a key word since we have looked at the growth trajectory of the infants by maternal age. One of the categories were pregnant women who were 15-19 years of age and this refers to the adolescent pregnancies. We also indicated this in the revised title of the manuscript.

Methods and materials sample size: we thank the reviewers for this important feedback. We have estimated the sample size needed for this study and included it in the methods section of the revised manuscript. The changes are also highlighted.

Population and inclusion criteria: thank you for this important feedback. Our study population were pregnant women and their newborns in the three districts of Oromia region. We have revised the section under study setting and population by including information about who were included in our study. we indicated “Inclusion criteria were women of age 15-24 years with a singleton live birth without any congenital anomalies.”

Validation of MDDW, Depression, wealth index: thank you for this important question. The
tools we have used are standard tools which are commonly used in similar settings. For the MDDW assessment, we have used the tool developed by FANTA and being used for similar settings to assess dietary diversity of pregnant women. The reference is also cited on page 7 reference number 26. The PHQ9 tool which we used to assess depression was validated among pregnant women in the same setting among pregnant women. The wealth index tool is also commonly used tool by many other researches in low and middle income settings. The reference we cited also indicates a standard method of constructing wealth index in such settings. However, in the revised manuscript we have removed MDDW and depression from our model based on the suggestion from the reviewers and also considering that these variables have more of meditational role than confounding effect.

Why include depression, MDDW and wealth index in the model: thank you for this important feedback. In the revised manuscript, we have removed some of the variables including MDDW, maternal MUAC, depression and birth weight from our analysis in order to avoid over adjustment in the model and also controlling the effect of maternal age only for potential confounders not for variables which have meditational role. Therefore, the fixed effect variables were limited only to the variables described in the revised table 2.

Reference for MUAC 23 cm: thank you for the feedback. we have used the cut-off as 23 cm after referring that a maternal MUAC less than 23 cm is associated with various adverse birth outcomes and considered for different nutritional interventions. However, we have excluded the statement from the revised manuscript as we are not considering MUAC in our revised analysis.

MUAC vs BMI: we thank the reviewers for their feedback. we have used MUAC to assess nutritional status of women over BMI during pregnancy. BMI is referred to be less accurate to assess nutritional status of pregnant women due to body changes that occur due to the pregnancy. However, we are not considering MUAC as one of our fixed effects variable in the revised analysis.

Discrepancy between 1423 eligible and 1378 analyzed: thank you for your feedback. We described on the flow diagram that 1,423 pregnant women, who were 15-24 years of age and met the inclusion criteria were included in our study. But analysis was based on only 1,378 subjects who had at least one additional follow-up measurement to the baseline. Thus, in this study we had a lost to follow up of 45 subjects. In order to clarify these points, we have edited the description about the study subjects on page 6 line number from 109-113 and also edited the flow diagram.

Illness in the previous 2 weeks: thank you for the feedback. We have measured this by only maternal reporting and it might be subjective. But as it is done in many community surveys, we have asked the mothers to report any symptom of illness (fever, cough, diarrhea..) that the infant encountered for which the mother seek or not seek medical treatment. Then this data were used to construct the variable illness. This process is explained in the revised version of the manuscript from line number 148-149.

Importance of Table 1: we would like to thank the reviewer for the suggestion. Since we wanted to look at the difference in infant linear growth by maternal age, understanding the distribution of other confounding variables by maternal age would give detail information for the readers on potential difference between the two groups by important variables. Therefore, we prefer to keep the table in the result section. However, it should be noted that, our use of multivariable regression model adjusts for potential confounding when estimating the association between linear growth and the different explanatory variables.
The mothers involved in the present study were not significantly different by most of their socio-economic and nutritional characteristics irrespective of their age. How can measure statistically, I did not see statistical output? thank you for this important feedback. The data from table 1 which shows differences of various exposures by maternal age supports this claim. In order to make it more clear in the revised version of the manuscript, we have referred table 1 after the statement.

what is the importance of the paragraph, it seems background better to shift it": thank you very much for this suggestion. This paragraph was included to show the general implication of the study findings and how to relate with the existing situation in the country. In the revised version of the manuscript we have presented it under the sub heading of implications.

Ethical issues: thank you very much for this important feedback and we apologise for not providing enough information in the first version. We have clearly presented the ethical issues by including the following information in the revised version “Ethical approval was granted from the Institutional Review Board of Jimma University in Ethiopia (RPGC/264/2013) and Tufts University in USA (Tufts Health Sciences Campus IRB reference number:11088) before commencement of the study. Informed consent was obtained from the participants after a detailed explanation of the objectives of the study. Data was registered and stored in a secured server and access to the data was upon permission of the principal investigators with personal identifiers removed. During the study women or infants who had health problems were referred to a nearby health facility to seek proper medical care.”