Author’s response to reviews

Title: Determinants of Stunting among children aged 6 to 59 months in pastoral community, Afar Region, North East Ethiopia: Unmatched Case Control Study

Authors:
molla kahssay (mollaka2005@gmail.com)
Etsay Woldu (etsaywold@gmail.com)
Abel Gebre (abelgebre21@gmail.com)
P. Surender Reddy (dr.surenderreddy@yahoo.com)

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Author’s response to reviews:

Response to reviewer comments

Dears,

we authors are very thankful for your detail review of the manuscript.
we aggressively revise the document from top down, hope and we believe your concerns are addressed in this final manuscript.
corrections are already done in the main manuscript file, here are also point by point response for your questions.
we thank you again, we strongly belive the consideration of this paper for publication.
we are looking for your positive and timely response.

thanks!!!

Mary Penny, MA MBChB (Reviewer 1):
Comment/Question: The authors are to be congratulated for their concern to understand and publish the reasons for stunting in their population.

Question-1. However, the results are similar to what might be expected from the literature so it is difficult to see what additional information is added from the study above the usefulness of this information to local authorities in the country.
Response: Dears, we thank you for your careful review of the manuscript. Regarding the issue you raised on the additional information which the paper is going to provide is, as you see it the study was
conducted in a place where all forms of malnutrition (Stunting, Wasting and underweight) are prevalent and as a national level malnutrition is specifically higher in the study setting. Your concern is you found researches done so far with similar title, but this study is done in pastoral community whereby the livelihood of the people, health service coverage, and health seeking behavior of the people is quite different and relatively lower. Besides of this, even though stunting is prevalent in the study area the determinants or risk factors are not clearly known, studies regarding determinants of stunting are limited in the study area. Hence, this study was aimed to asses’ determinant of stunting in pastoral community (study area).

Question-2. However my main concerns are about the methodology chosen and in particular the creation of the two clusters: stunted and not stunted. It is not clear how these two groups were selected. The authors state that "All children age 6 to 59 months living in the selected kebelles were measured for their z-score of height for age and categorized as stunted and not stunted using WHO standard growth chart" but it is not clear how the 161 cases and 161 controls were selected from all these children as presumably there were more than 322 children measured in total, this is important as bias may have been introduced by this selection process. The method used for measurement of the mothers does not sound very accurate but this may not be a major problem. It is a pity that no dietary information other than breastfeeding was included, for instance main staples in the diet and access to animal source foods as this might also have been useful information that might potentially be used for planning interventions. The text does need substantial editing to correct the English.

Response:  
A house to house census was made in 5 randomly selected kebelles (the smallest administration unit in Ethiopia) to enumerate all children of age 6 to 59 months. All children aged 6 to 59 months who lived for more than six months in the randomly selected kebelles were enumerated. Anthropometric measurement of the children were taken for all children of age 6 to 59 months living in selected kebelles and were measured for their z-score of height for age and categorized as stunted and not stunted to generate sampling frames for cases and controls by a census conducted prior to the actual data collection. Based on this children were categorized as cases (anthropometric reading with z-scores < -2SD) or controls (anthropometric reading with z-scores ≥-2SD) based on the median of WHO 2006 reference population. After anthropometric measurement of all the children aged 6 to 59 months was taken, children from each selected kebelle were identified and registered sequentially and got identification number and were enrolled as cases and controls. After identification of the number of cases and controls in each randomly selected kebelle, proportional allocation of samples was made in relation to the number of sample size allocated for the study. Based on this A total of 322 (161 cases and 161 controls) were taken from the randomly selected kebelles. Finally, mother-child pairs from each selected kebelle were enrolled using simple random sampling method. Interval (K value) was determined for each kebelle by dividing the total eligible children in the kebelle to the sample proportion. The first household was selected by lottery method. In case more than one eligible child was found in a household, only one child was selected using lottery method.
Reviewer 2 (Reviewer 2): PEER REVIEWER ASSESSMENTS:

PEER REVIEWER COMMENTS:
GENERAL COMMENTS: This case-control study identified the determinants of stunting among children aged 6 to 59 months in a low-resource setting. The manuscript addressed an important public health issue, particularly in low-resource settings. However, this manuscript will benefit from a major review before considering it for publication.
Response: We have made a serious revision on this manuscript file based on your comments; hope much of your concerns are answered. We really appreciate all of your efforts you are making in order to get this paper published. We thank you all!

REQUESTED REVISIONS:

Abstract
1) The authors should rephrase this statement properly "In Ethiopia, Nationally the prevalence of stunting in under five years children was 38.4% and in Afar it is above the national average (41.1%)"
Response: it is rephrased as follows,
In Ethiopia, Nationally the prevalence of stunting among under five years children was 38.4% and in Afar it is above the national average (41.1%).

2) The authors should replace the keywords with "stunting, determinants, children, Ethiopia"
Response: Stunting, Determinants, Children, Samara University, Ethiopia

Introduction
3) The authors should decide if they want to use the word "predictor" or "determinant"
Response: We preferred to use determinant and we replaced predictor with determinant

4) In page 3, line 24-26, the authors should reference this statement "Evidence revealed that the problems responsible for child under-nutrition are numerous and basic problems like political instability, slow economic growth and lack of education are among them"
Response: Evidence revealed that the problems responsible for child under-nutrition are numerous and basic problems like political instability, slow economic growth and lack of education are among them. Underlying causes such as, food insecurity, lack of maternal and child care services provision, and immediate causes, like infections and inadequate dietary intake were the main factors affecting under nutrition.

5) In page 4, line 4-6, the authors stated that "Despite of the reduction in stunting prevalence by 19.6 % from 58% in 2000 to 38.4% 2016 in Ethiopia, the progress is still stagnant at National and regional level [3]". The authors should rephrase this statement clearly.
Response: In Ethiopia, stunting prevalence decreased by 19.6 % from 58% in the year 2000 to 38.4% in 2016, but the progress is still stagnant both at national and regional levels[3].

Methods
6) The authors should justify how they arrived at the independent variables considered in this study
Response: Authors have made a review of different literatures on the subject area or similar studies conducted so far were carefully reviewed. UNICEF conceptual framework for causes of malnutrition (stunting) was also considered. Based on this immediate causes (inadequate intake and diseases),
underline causes (household food insecurity, poor maternal and child care, lack of access to health service and unhygienic environment) and basic causes (political, ideological, economical…) causes of malnutrition were considered. Besides of this we have tried to contextualize the identified variables with livelihood of the people, with health service coverage, with health seeking behavior of the people in the pastoral community. Finally, based on the inputs from different literatures and the context in the study setting we reached in to the independent variables.

7) The authors should provide information on how they selected the required sample size from the population of under-five children assessed for stunting
Response:
A house to house census was made in 5 randomly selected kebelles (the smallest administration unit in Ethiopia) to enumerate all children of age 6 to 59 months. All children aged 6 to 59 months who lived for more than six months in the randomly selected kebelles were enumerated. Anthropometric measurement of the children were taken for all children of age 6 to 59 months living in selected kebelles and were measured for their z-score of height for age and categorized as stunted and not stunted to generate sampling frames for cases and controls by a census conducted prior to the actual data collection. Based on this children were categorized as cases (anthropometric reading with z-scores < −2SD) or controls (anthropometric reading with z-scores ≥−2SD) based on the median of WHO 2006 reference population. After anthropometric measurement of all the children aged 6 to 59 months was taken, children from each selected kebelle were identified and registered sequentially and got identification number and were enrolled as cases and controls. After identification of the number of cases and controls in each randomly selected kebelle, proportional allocation of samples was made in relation to the number of sample size allocated for the study. Based on this A total of 322 (161 cases and 161 controls) were taken from the randomly selected kebelles. Finally, mother -child pairs from each selected kebelle were enrolled using simple random sampling method. Interval (K value) was determined for each kebelle by dividing the total eligible children in the kebelle to the sample proportion. The first household was selected by lottery method. In case more than one eligible child was found in a household, only one child was selected using lottery method.

8) The authors should explain how they handled multiple gestation (Twins).
Response: Actually we didn’t face twins, but we were planned to interview either of the twins by lottery method.

9) The authors should explain how they addressed missing data
Response: First, during data collection period, tight supervision and day to day follow up was undertaken to prevent missed data. Besides of this data cleaning has been done before data entry. After data entry and after frequency table was run and fortunately no missed data was observed.

10) The authors should explain how they assessed the underlying assumptions of the regression model
Response: Binary logistic regression model was considered for the dependent categorical variable stunting (Yes (case), No (control)). Univariable binary logistic regression was used to assess the association of one independent variable with the dependent variable. Multivariable binary logistic regression model was used to identify association of independent variables with the dependent variable after control of all possible potential confounders. Multicollinearity was checked using Variance
Inflation Factor (VIF) and tolerance test. The p-value < 0.05 was considered to be significant and confidence interval for odds ratio was set at 95%.

11) The authors should explain how they checked the fitness of their regression model. Response: Hosmer-Lemeshow goodness-of-fit was used to test for the model fitness (if the p-value is >0.05, the model fits; if p-value <0.05, the model is unfit).

12) Regarding the integrity of the data, the authors should clarify if verification and validation of the data was performed. Response: Regarding verification and validation of anthropometric data careful measurements of height were made and timely calibration of weight measuring tools were also made. The weighting scale was checked and reset at zero point for every consecutive study subject. Mothers who didn't know exactly the age of their child, immunization card were used or precision in age was maintained to the nearest month.

13) The authors should explain why they obtained oral informed consent instead of asking the participants to sign informed consent forms. Response: sorry for the typing error so far. It is a written consent obtained from each participant mothers/caregivers before starting the interview. Response: Regarding verification and validation of anthropometric data careful measurements of height were made and timely calibration of weight measuring tools were also made. The weighting scale was checked and reset at zero point for every consecutive study subject. Mothers who didn't know exactly the age of their child, immunization card were used or precision in age was maintained to the nearest month.

14) Income is always difficult to measure in low-resource settings, the authors should explain how they were able to assess income among the participants including those who are not educated and petty traders who cannot distinguish between profit and capital. Response: Sure, it is difficult to know the actual and reliable amount; but we have tried our best to reach in to the possible amount of income. For those who had monthly income it was easy to measure income. It was a bit time taking to calculate income for those who were pastoralists whose livelihood is animal herding and income was calculated by considering the average amount of herds brought in to market for sell per month (if it is every 3 month that the household sell herds it will be computed for 3 months and divided by 3 to get the amount of income per month). In case when it was difficult to directly measure monthly income, the total income per a year was calculated and divided by 12 (total months in a year) in order to get monthly income.

15) The authors to justify why they omitted some important determinants of stunting. For example prematurity/low birth weight, maternal comorbidity, postnatal service, under-fives children in the family, family type, and child comorbidity (measles and HIV infection). Response: Yes still some variables are missed this is something that we put as a limitation.

Results
16) The authors should check table 1 as the percentages did not add up to 100% e.g. maternal
The authors should change "binary logistic regression" to "bivariable logistic regression"
Response: Note that, when we say ‘variable’ it always refers to the independent variable and when we say ‘binary’ it refers to the dependent variable and ‘binary’ is to mean the dependent variable is categorical with two outcomes. In this case stunting is the dependent variable with two outcomes or is categorized in to ‘yes’ (cases) and ‘No’ (controls).
Therefore, ‘bivariable’ is the term we use when we use to know the association of one independent variable with the dependent variable, it is also called univariable. Actually univariable is the appropriate term. In this case ‘multivariable ’ refers is the term we use when we use to know the association of many independent variables with the dependent variable controlling the confounders. We have used the term ‘univariable or/and multivariable binary logistic regression to mean that the dependent variable stunting is a categorical variable with two outcomes. Hence, revisions are made accordingly in the main manuscript file.

The authors should note that the results presented in table 2 included the results from bivariable and multivariable logistic regression. Thus, the authors need to amend the title.
Response: Revisions are made accordingly in the main manuscript file.
Since it table-4 include both univariable and multivariable analysis results, we named it like ‘binary logistic regression analysis’, which includes both terms.

In page 8, line 32-46, the authors should present the OR, P-value and 95%CI of the significant findings.
Response: Revisions are made accordingly in the main manuscript file.

Discussion

The authors will need to reference some statements in the discussion e.g. "This might be probably colostrum provides protective effect to the newborns"
The authors do not need to present "result values" in the discussion.
The authors have over-used some phrases such as "This is consistence with" and "The odd of". The authors should replace it with other phrases.
The authors should dwell more on the inherent limitations of this type of study. For example, only participants who were still alive will be identified as cases/controls. Stunted children are more likely to die than those who are not. Also, it is difficult to know if some of the determinants preceded stunting.
The authors should provide policy implications of their findings.
The authors should proofread this manuscript carefully and correct the grammatical errors

Response: for question no 20-26, revisions are made accordingly in the main manuscript file.