Author’s response to reviews

**Title:** Mothers' health service utilization and attitude were the main predictors of incomplete childhood vaccination in east-central Ethiopia: A case-control study

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**Author’s response to reviews:**

Reviewer comment and author response

1. Abstract

- Line 31: Include unique inputs of your research or any local data that can amplify the significance of your study.

Author response

Answer: Dear Reviewer, thank you very much for your critical view and comment!

* In the abstract section, it is mentioned that low vaccination coverage in Ethiopia as well as in the study area is a problem and community based study to identify predictors were not largely explored. Besides the points that underlined the frequent outbreak of measles in the district is mentioned in the background section can be further justification

2. Introduction

- Line 65-68: What about the newly added vaccines (PCV, Rota vaccines)?

- Consider updated references and don't use reference of reference, rather use source references.

- Line 69: Check for errors in sentence writing.
Still the authors are using old references.

Consider EDHS 2016 reports.

Include specific local contexts concerning incomplete immunisation which driven the research to be undertaken in that specific district and the research gaps that your research intended to fill.

Author response-2

Answer: Thank you again!

- Off course, at the time where the study was conducted, children are considered as fully vaccinated where a child is took BCG, three doses of Pentavalent and PCV, three doses of OPV, and measles vaccine before her/his first birthday. Whereas, at the first time where rota vaccine is introduced in 2013, study participants (children aged 12-23 months) are already missed rota vaccine, and that is why rota vaccine is not included to determine the status of childhood vaccination.

- References are updated in the revised version of the manuscript

- Errors in sentence structure is amended

- Recent reports such as 2016 EDHS report is used accordingly in this document

- Now point that justify why the study is conducted is mentioned
3. Methods

- Line 120: How did you selected the six rural kebeles thru random or purposive selection?

- Include a summary chart of your sampling techniques, otherwise, it is difficult for your readers to understand your sampling steps and how you applied the stratified multistage sampling technique? And also a summary table which illustrates the total number of cases and controls of each kebele from the census and in your final sample.

- Why you preferred the stratified multistage sampling technique and what is your basis to form the stratas; these issues should clearly be articulated in your paper.

- Why you favoured one to one case to control ratio, from view of precision in comparison?

- Line 130: Was your data collection tool developed by you own? Describe the content areas of your measuring tool?

- Line 139: Use bullets for each operational definition.

- Line 144-145: How did you resolved any discrepancies between maternal reports and immunisation records?

- Line 165: ….bi-variable analysis…… replace with 'bi variate analysis'. Also check for other similar errors in the document.

3. Author response

Answer: Thank you!
• In the district, there are 26 kebeles (25 rural and one urban kebele), and 6 rural kebele is selected by simple random sampling and the only urban kebele is selected. Diagrammatic presentation of Sampling procedure is illustrated (I have attached diagrammatic presentation of sampling procedure)

• Cases and controls in each selected kebele are showed in table in the revised manuscript (see Table-1 & 2)

• The assumption to use stratified multistage sampling is that since the study is conducted in the district having both rural and urban, it is the fact that vaccination coverage is significantly different among these areas, and that is why initially the districts are stratified into urban and rural kebeles

• Regarding the ratio of control to cases, as far as my knowledge goes, if there is adequate number of cases, one control to a case is optimal, while in cases when there is small number of cases, investigators should increase the ratio. Actually, if we increase controls the precision will be increase, and investigators should balance the cost due to increasing the sampling size and sampling efficiency.

• Data collection tool is adapted from WHO EPI data collection format and also by reviewing various literatures. Socio-demographic and economic variables, health service characteristics of respondents were included to construct data collection tool.

• Bullet is used to list operational definitions

• To verify the vaccination status, in area where there is low uptake of vaccination card, WHO recommends, vaccination card and mother’s oral response can be used to know the status of vaccination. In case where there is vaccination card, vaccination status is verified from the card, however if there is no card, mother oral response can be used as an alternative. Sometimes if there is discrepancies between the card and mother’s response, health service record can be used to confirm child’s vaccination status.
• The word “bi-variable” is replaced by “bivariate” throughout the document and further editorial errors are corrected accordingly.

4. Results

- Line 192: rewrite as…Mothers' health service related characteristics

- Line 211: mother's satisfaction of what?

- Table 3: Presenting COR is not necessary, instead better to include P-values to easily indicate significance level.

4. Author response

Answer: Thank you again!

• The word “Mothers and Health service” is amended according to your suggestion

• The word “mother’s satisfaction” was to mean mother’s satisfaction to health service and corrected.

• Off course as it was clearly stated in the method section, variables that had a p-value of less than 0.2 at bivariate logistic regression were a candidate for multivariate regression analysis. As you have seen in the table-3, unless variables had a p-value of less than 0.2, it will not have results of adjusted regression output.

5. Discussion

- Line 221-226: It seems a background information rather than discussion part.
Line 245-246: But 'Home visits by HEWs' was assessed in your study and was not a predictor of defaulting. So, how your justification can be explained, do you suspect any co-linearity or synergistic effect between variables?

5. Author response

Answer: Thank you!

- Introductory section in the discussion section is used as a catch up phrase, and now included in the introductory section

- Off course health worker home visit is not a predictor variable at multivariable analysis. But as you mentioned we stated incomplete childhood vaccination was higher among mother who delivered at home, and one of the possible justification might be absence of home visit by health extension workers. Although home visit was not found significant predictor at multivariate analysis cross-tabulation result and bi-variate analysis indicated that there is association between incomplete vaccination and home visit. Co-linearity between variable was assessed and not showed significant co-linearity. But the analysis indicated that incomplete vaccination among home delivery might be poor access to health service, which might be affected by health extension workers home visit.

6. Conclusion

- Make your recommendations specific to some responsible body.
- Avoid bullets in this section.

6. Author response

Answer: Thank you!

- Bullets are deleted in the conclusion section and recommendations are focused for some responsible body to be more practical.
7. In addition to the above comments, as a general comment, extensive editing of the research article for grammatical errors and improper writing is needed.

7. Author response

Answer: Thank you!

- Extensive Language editing is made throughout the document

Editorial comments

1. Why were social position indicators such as educational attainment not included in the multivariate logistic regression

1. Author response

Answer: Thank you dear for your relevant comments!

- Regarding the variables considered in multivariate logistic regression, only variables which had a p-value of less than 0.2 at bivariate regression analysis were eligible for multivariate logistic regression analysis. Variables which had a p-value of higher than 0.2 were not considered in the multivariate analysis table. Finally, variables which have a p-value of less than 0.05 at multivariate logistic regression analysis were considered as significant variables for the outcome variable. Some of the variable such as education status did not show significant association (p-value <0.2) at bivariate analysis and that is why it is missed at multivariate logistic regression analysis.

2. the conclusion should be strengthened with more concrete actionable recommendations

2. Author response

Answer: Thank you dear for your critical view!
• Conclusion are made based on significant variables and correction are made with actionable recommendation

3. A careful language revision will further improve the manuscript

3. Author response

Answer: Thank you dear reviewer!

• Language edition is made accordingly throughout the document