Author's response to reviews

Title: Predictors of Oral Rehydration Therapy use among under-five children with diarrhea in Eastern Ethiopia: A community based case control study

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Author's response to reviews: see over
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To: Public Health Journal, Editorial Board

Dear Editor-in-Chief,

Please find the revised manuscript entitled “Predictors of Oral Rehydration Therapy use among under-five children with acute diarrhea in Eastern Ethiopia: community based study.”

We thank you and reviewers for the constructive and insightful comments. We have now built on and improved the manuscript based on the comments we received. We have tried to address your comment on sampling strategy and discussing the finding with qualitative studies.

We look forward to your feedback to the revised manuscript.

Best regards,

Bezatu Mengistie, also on behalf of the co-authors

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Responses to Reviewers

We kindly thank the reviewers for their constructive and insightful comments. The paper has improved significantly through the guidance of your comments. We have now addressed them and are appending a detailed response to each of the comments. Some of the variables are re-categorized and consequently the data is re-analyzed. But there is no significant change.

Best regards,

Bezatu Mengistie, also on behalf of the co-authors.

Reviewer #1:

1. What has been known in the past regarding the predictors is not described in the introduction

   Response: Done. Factors identified by other researchers are added.

2. “To reduce recall bias, children with persistent diarrhea were excluded from the study”.
   As far as these children were having diarrhea in the past 2 weeks, what is the worry about recall bias?

   Response: These children had diarrhea more than two weeks even months. Since the diarrhea had long duration, the caregiver may not remember what she had done exactly in the last two weeks.

- Cases and controls were identified by conducting a canvas survey of all the households in the demographic surveillance village. A sampling frame which enlists all the eligible study subjects was prepared for the controls. The study participants were all the cases and controls selected from the sampling frame using simple random sampling technique”. How many under-five children with diarrhea in the preceding two weeks who received ORT (Cases) and how many under-five children with diarrhoea in the preceding two weeks who did not receive ORT (controls) were found during the canvas survey?

   Response: We understood your valid comment. Now we have included the information. A total 956 (243 cases and 713 controls) children with diarrhea were identified

   - The sample size calculation should come before the sample selection
     Response: Done.
- When you calculated the sample size, the exposure variable considered was education. Why did you take this variable? In fact later on when you check for association, education didn’t show significant association

**Response:** Many studies showed the association of educational status with ORT use and this variable gives a maximum sample size.

- What do you mean when you say “access to Oral rehydration solution (ORS)”?

**Response:** Defined in the methodology part. It is the estimated walking distance from home to the health facilities where ORS could be found. Less than one hour walking distance was categorized as “had access” and one hour or longer walking distance was categorized as “no access”.

- To assess their knowledge, caretakers were asked to respond to five questions. These were ever hearing, preparation, initiation, and benefits of ORT including time to use the prepared ORS. The responses were given score of 1 for the correct and 0 for the incorrect. The values of the five variables were combined to get the total knowledge score about ORT. Based on their responses, the knowledge of the caretakers was categorized as ‘good’ if the total score was greater than the mean and ‘poor’ if it was less than or equal to the mean’. Why do you prefer the mean as a cut off point to say the care giver is knowledgeable? Why not, for example, those who scored 3 points and above out of 5 are considered as having good knowledge?

**Response:** Many studies use the mean if the data is normally distributed and median if the distribution is not normal. This was done to compare the finding with other studies.

3. Table 1 is about socio-demographic and economic characteristics of cases and controls. It is good to remove the Crude OR from this table as the purpose of this table s to show the characteristics of the study subjects. If the purpose is to show associations, the title of the table shall be changed.

**Response:** Done. The purpose is to show association. The title of table is modified accordingly.

- Foot note of Table 3 says “Multiple responses were possible”. This means that the categories of each independent variable are not really independent. If they are not independent, then how can you assess association with the dependent variable? In fact the referent category for such variables is not shown!

**Response:** Taking your comment in to consideration variable with multiple responses is re-categorized in a more meaningful way. For other variables the reference category is shown clearly.
In the final model, variables from the first and the second model were put together, along with one additional variable, access to ORS”. What was the reason for differently treating access to ORS that it was not considered in either of the 2 models?

**Response:** The first category is socio-economic and the second category is caregivers’ behavior. Access to ORT is not in the either of the two category. However, to avoid confusion the title of one of the category is modified as “caregivers behavior and access to ORS” to accommodate access to ORS and Re-analyzed in the second model.

4. It was a general comment. No need of response

5. “The presence of ORS sacket at home during the onset of diarrhoea was not significant between cases 24(9.9%) and controls 17 (6.7%) (OR= 1.53, 95%CI=.80-.93)”. Do you have any explanation for this? Normally if ORS is available they should have used it?

**Response:** we understood this valid comment and tried to give the possible reasons in the discussion part. But it needs further study.

- “We found out that seeking health care was significantly associated with ORT use. This finding is consistent with a study conducted in Kenya [23], where caretakers who seek care at the health facility were more likely to use ORT compared to their counterparts”. When you say “seeking health care” is this referring to general health seeking behavior or seeking health care during the current episode of diarrhea. If you are referring to seeking health care during the current episode of diarrhea, is it surprising if those who visited health institutions used ORT more than those who remained at home?

**Response:** Yes, we mean seeking advice or treatment during the current episode of diarrhea. There are literatures that indicated antibiotics are more preferred than ORT by many health workers. We didn’t assess general health seeking behavior.

- Is recall bias a major problem in this study?

**Response:** It is not a major problem. But there could be recall bias to some extent.
Reviewer #2:

The reviewer has provided us a general comment that was followed by a well detailed comment. We have provided the responses accordingly.

General comments
It is better to use the term ‘caregiver’ than ‘caretaker’ in the whole manuscript caretaker could mean custodian. At some sections of the manuscript the term ‘caretaker’ alone is used and in others the term ‘mother/caretaker’ is used. I recommend you to use the term ‘caregiver’ alone consistently.

Response: done. Caregiver is used instead of caretaker or mother/caretaker.

Introduction
1. Second statement: delete the phrase in parenthesis as the idea is presented in the third statement and hence it would be redundancy.

Response: Done. Deleted to avoid redundancy

Methods
2. First paragraph: delete the phrase in parenthesis put to elaborate the term ‘kebele’ as the term had been already been clarified in the introduction section.

3. Second paragraph, first statement: replace the phrase ‘the cases under five children with diarrhea in the preceding two weeks who received ORT’ with the word ‘cases’.

4. Revise results of the abstract in line with comments given in the body of the manuscript.

5. Revise the key words to make them pertinent. For instance you might restate ‘case control studies’ as case ‘control study’; delete ‘case management’, restate ‘determinants’ as ‘predictors’ and restate ‘solution’ as ‘therapy’.

Response: Method section 2-5 done according to the comments

Methods
6. First paragraph, last statement: cases and controls are defined as children with diarrhea who received and didn’t receive ORT in the preceding two weeks, respectively. The time frame for the description ‘in the preceding’ is not specified. Mention preceding what. Make such revision elsewhere in the manuscript.

Response: Revised. Now it is read as “…preceding two weeks before the survey”

7. Third paragraph: restate the phrase ‘ratio of 1:1’ as ‘case to control ratio of 1:1’

Response: Done as shown above
8. Fourth paragraph, second statement: reconstruct the statement without use of additional clarifications in parenthesis to make it self-explanatory.

   **Response:** revised

9. Fourth paragraph, third statement: replace the word ‘that’ with ‘who’ and ‘project’ with ‘center’.

10. Fourth paragraph, fifth statement: delete the phrase ‘with diarrhea’ and the word ‘primary’.

11. Fourth paragraph, last statement: delete the word ‘closely’.

12. Eighth paragraph, fifth statement: replace ‘was’ with ‘were’.

   **Response:** comments 9-12 done accordingly

Results

13. Under the subtitle ‘Caretakers’ knowledge and utilization of ORT’, second statement: restate the statement as ‘…management of diarrhea which is higher compared to…’

14. Fifth paragraph, second statement: insert ‘seeking’ before the word ‘advise’.

15. Fifth paragraph, last statement: indicate that the values in the parenthesis refer to 95% CI.

   **Response done:** we have done all the comments from 13-15

Third statement: delete the verb to be ‘be’.

Authors’ information

Third statement: add the word ‘including’ after public health and change the word ‘method’ with ‘methodology’.

   **Response:** we have done so

1. The title is stated as “Predictors of Oral Rehydration Therapy use among under-five children in Eastern Ethiopia: A community based case control study”. Looking at the title it seems that the study included all under-five children whereas only children with diarrhea were eligible for the study. Restate the title so that it reflects the fact that the study participants were children with diarrhea.

   **Response:** Revised as suggested by the reviewer. Now the title is read as “Predictors of Oral Rehydration Therapy use among under-five children with acute diarrhea in Eastern Ethiopia: community based study.”
Methods

2. Second paragraph: the idea of the first statement is reflected in the last statement. Integrate the two statements to avoid redundancy.

   **Response:** Done. Summarized as commented

3. Second paragraph, third statement: it is stated that cases and controls were selected through canvas survey. During the survey, it is logical to assume that, you used a definition which mentions the time frame ‘preceding two weeks’. If the main study was carried out latter, some participants would be lost as the time frame ‘preceding two weeks’ might not apply. How did you manage or took into account for such discrepancies?

   **Response:** The survey took two days and the data collection completed with three days. As you said two participants from the cases could not be found at the time of the data collection.

4. Second paragraph: Place the description about sampling technique after description about sample size determination. The sampling technique describes that controls were randomly selected from a sampling frame prepared after the canvas survey. How about for the cases? Describe.

   **Response:** Done. The description of the sampling technique is placed after the sample size determination. Only 243 cases were identified during the survey. All the cases were included as the sample size for the cases were 253. It is described in the methodology.

5. Third paragraph: it is stated that one of the assumptions in sample size determination was ‘detectable odds ratio of 1.74’ and a reference where the value is taken is cited. However, such value can’t be found in the cited reference. Make necessary revision.

   **Response:** Done. The citation was for the exposure variable (educational status).

6. Fifth paragraph: the list of variables includes ‘access to ORS’ and ‘health seeking behavior’. These variables need to be operationally defined in order to make it clear to the reader how they were measured. In addition the meaning of variables ‘recognizing the severity of diarrhea and dehydration’ is not clear. Restate them clearly.

   **Response:** we understood this valid comment. Access to ORS is defined in the methodology and the meaning of the variables mentioned in the result part.

7. Sixth paragraph: it is stated that the definition of ORT includes ‘increase fluids’ besides provision of ORS and home recommended fluids. How did you assess and accommodate ‘increase fluids’ this in the study?
**Response:** As stated in the method section it is based on the caregivers report. The caregiver was asked the amount of fluid given to the child. If the child received the WHO recommended amount of fluids it is categorized in the cases group.

8. Seventh paragraph: Knowledge of caretakers was categorized using mean score as cut off point. What is your basis for such classification? Describe. Did you check distribution of the scores before classification? If not, check whether it is biomodal or unimodal. Classification into two groups is preferred for data with bimodal distribution and into three or more for data with unimodal distribution.

**Response:** Thank you. Yes, we have checked the distribution of the data. Mean is appropriate for data that is normally distributed. The other option was median but it is for the data that is not normally distributed.

9. Eighth paragraph, sixth statement: which method of logistic regression was used? Mention whether it was forward, backward or enter method.

**Response:** done. We used enter method.

10. Eighth paragraph, last sentence: What is basis for using p<0.1 to select variables for multivariate analysis? Mention. It is also stated that ‘…the variables with p<0.05 were identified in the final logistic regression model considered as significant’. Restate it as ‘…the variables with p<0.05 in the final logistic regression model were considered as statistically significant’. You should also mention what measures were undertaken to check for multi-collinearity among independent variables.

**Response:** described in the method section. P values for the selection of variables for the multivariate analysis depends on the number of variables in the final logistic regression model and the number of observations. Excess number of variables in the multivariate analysis makes the model unstable. To avoid this P<0.1 was used. After we received the comments, we re-categorized some of the variables based on the comments. The number of variables that entered in the final model reduced and the selection criteria changed from P<0.1 to P<0.2. Multi-collinearity of independent variables was checked using standard error of Beta coefficient. All values were below 2.

11. First paragraph, third statement: the numerical adjectives are placed after the nouns. For instance the statement begins as ‘Most of the cases 202(83.8%) and…’. This is not grammatically correct. There are several instances of such errors elsewhere in the results section. Reconstruct the statements in such a way that numerical adjectives are placed before the nouns or by using translational phrases.

**Response:** done
12. The term utilization in the subtitle ‘Caretakers’ knowledge and utilization of ORT’ doesn’t comprehensively and appropriately reflect the contents under the title. Restate it.

**Response:** It is revised and read as “caregivers’ behavior and access to ORS”

13. The way results are written is erratic. For some independent variables you have presented absolute and relative frequency of their values among cases and controls, their OR values and additionally narrated magnitude of the proportions and the presence statistical significance. Example of such variable includes wealth status. For other variables like ‘perceiving teething as cause of diarrhea’ proportions are not presented. Furthermore for other variables like ‘perceived signs of severity’ presence of statistically significant association was not narrated. Revise the whole results to make the way of narrations consistent and pertinent focusing on prominent findings and not necessarily describing all contents presented in tables.

**Response:** Thank you. Done accordingly

14. Revise use of the word ‘significant’. You sometimes used the word to refer to statistical significance and in other instances to refer to higher proportions. This creates ambiguity. For instance its use in last statement under the subtitle ‘Caretakers’ knowledge and utilization of ORT’ is not clear whether it refers to statistical significance or to the magnitude of proportions.

**Response:** Done. When we say significance, it is to show statistical significance.

15. Some of the contents under results section are given subtitle but others are not. The second and third paragraphs are given subtitle but not to the first and fourth paragraphs. This made the results to lack cohesion. Revision is necessary in order to maintain coherence flow of contents.

**Response:** Revised. Subtitles was not a such important and deleted

16. Fifth paragraph: the variables stated as ‘…perceived causes, assessment of severity of diarrhea and dehydration’ are not clear and not stated the same way as in the methods and third paragraph of results. Make necessary revisions. Variables mentioned in the second statement came out of those mentioned in the first statement but ‘advice or treatment from health facilities’ is mentioned in the second but not in the first statement. The list also misses the variables ‘presence of ORS at home’. Besides all the lists in the second statement are variables names, except the last one which refers to value of a variable. Revise them to maintain consistency.

**Response:** we have done so
17. Fifth paragraph: the variables caretaker’s knowledge and care-related variables were entered altogether in multivariate logistic model. Most of the variables appear to be correlated. Did you check for multi-collinearity?

**Response:** yes, standard error was checked.

18. Paragraphs 4, 5 and 6: In the methods section it was described that those variables with p<0.1 were considered for multivariate analysis but here it is stated that multivariate analysis was performed for socio-demographic variables and for other variables separately and then selected variables were entered in final model. In the latter method predictor variables are screened twice. What is your rationale for doing so?

**Response:** This was done to see the effect of soci-demographic and behavioral factors separately. This gives a better understanding of the predictor variables when these two categories are taken together and separately. The screening was not twice. We enter the two category separately and together using the criteria P<0.2.

19. Last paragraph, second statement: from the description in the statement it might seem for the reader that those who perceived teething as cause of diarrhea were likely to use ORT and on top of this the reference category for this variable is not mentioned which creates more confusion. Therefore, it is better to mention specific category of the variables which is positively or negatively associated with the outcome and mentioning the direction of association.

**Response:** The comment is well taken. The reference category for these variables is no. Now some of the variables are re-categorized in and the reference categories are shown clearly. The direction of association is indicated.

20. First paragraph: as commented in the results section it is more clear and informative to mention categories of the variables positively or negatively associated with the outcome.

**Response:** We have done it.

21. Third paragraph, second statement: it is stated that knowledge of caretakers was associated with ORT use. Specify the domain of knowledge and mention the direction of association between knowledge and use.

**Response:** done. It is stated as “caretakers’ knowledge of ORT….”. The direction of association is indicated as necessary.

22. Fourth paragraph: the findings indicate that those who sought care from health facilities were more likely to use ORT. From this finding a conclusion is made that caretakers need advice of health care providers to use ORT and this may hinder immediate start of ORT. The conclusions drawn go beyond the findings. Firstly, the fact that those who sought care were likely to use
ORT doesn’t confirm that the ORT use was necessarily after seeking care. It is likely those who start ORT immediately might also seek care from health facilities latter. Hence, it is necessary to confirm which one precedes; seeking care or ORT use. Secondly, in order to identify factors that hinder ORT use, comparison of time of start of ORT should be made among all those who used ORT. Therefore, the discussion should be revised in a way that it is bases on the findings.

Response: We appreciate your comments. However, we have cited a qualitative study which supports the idea stating that caregivers wait for the confirmation of the health workers to give ORT to their children. In addition to this, we have tried to re-in force the finding using another data (source of information about ORT). From those who have heard about ORT the majority get the information from health workers (revised manuscript).

23. Fifth paragraph, fourth statement: the idea reflected about misunderstanding related to teething is not clear. Reconstruct the statement in meaningful way.

Response: Done

24. Sixth paragraph, first statement: reconstruct the description about association with educational status clearly.

Response: Done

25. Sixth paragraph, fourth and fifth statements: the reason that the population was homogenous with respect to educational status is used to explain the absence of statistically significant association. This can’t be a reason as long as valid statistical tests are performed.

Response: Reconstructed

Conclusion
27. First statement: indicate the direction of association.

Response: Done

28. Fourth statement: it is stated that caretaker’s should be encouraged. What are the caretakers encouraged to do? Mention it.

Response: Done

Tables
29. Why percentages are presented along with absolute frequencies only in table 3 but not in table 1 and 2?

Response: It is a mistake. Now percentages are included in table 1 and 2
30. Table 3: Computed COR values are presented for all categories of the first three variables without having a reference category. One of the categories for each variable should be a reference category and have a value of 1.

Response: The reference category was ‘no’ for each variable but it was not shown. To avoid confusion the variables are re-categorized in a more meaningfully way and reference categories are indicated.

31. Table 4: as commented earlier what is your rationale for using such method of variable selection for multivariable analysis?

Response: The criterion was the number of variables that enters the final regression model.

32. Table 4: The values of the variable ‘perceived teething as cause of diarrhea’ were ‘yes’ and ‘no’. It was found that those who perceive teething as cause were less likely to use ORT. However, the comparison group i.e the ‘no’ category as it can be inferred from table 3 includes the other misperception ‘evil eye’ and ‘no idea’ which both indicate lack of awareness on cause of diarrhea. Comparing one misperception with others doesn’t make sense. You may re-categorize the variable to have values ‘misperception’ and ‘correct perception’ and take the ‘misperception’ category as reference to make meaningful comparison.

Response: Thank you for the comments. We are not comparing one misconception with another. We are trying to identify the perceptions which are associated with ORT use. The reference category is ‘no’ for all variables. Now to avoid confusion, we included the reference category for all variables.