Author’s response to reviews

Title: Food taboo among pregnant Ethiopian women: magnitude, drivers, and association with anemia

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Response to reviewers
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Food taboo among pregnant Ethiopian women: drivers, and association with anemia

Dear Editor,

First, we thank you for the opportunity to revise the manuscript. We are very grateful for the time and effort the reviewers put on our work. The comments have indeed helped us in improving the manuscript.

We have entertained and addressed all comments and revised the manuscript accordingly. Details of our response and changes made are provided in bullet points in front of the comments below. Plus, the main changes made based on the comments are highlighted in yellow in the manuscript uploaded. Minor changes, like wording and spelling edits, are also done throughout the document, though we highlighted only the major changes. The document has been also format edited in consultation with the journal guideline.

Reviewer reports:

Reviewer #1:

Dear Reviewer,
We are very grateful for your comments, which helped us in improving the manuscript. We have entertained and addressed all comments provided and revised the manuscript accordingly. Please find details of our response and changes made, provided in bullet points in front of the comments.

Manuscript presents a nice first step to identifying whether food taboos specific to pregnancy could be a factor in whether these pregnant women have anemia. In general, the approach is well done, just requires some clarifications and simpler text in some places.

Overall, the authors should add more on the actual taboo foods, and which actually have potentially biologically plausible links to anemia. If all taboos are included, you risk using food taboos as an actual confounder of a lot of other practices that might be the cause of anemia, other than the taboos. For example, are the taboos actually among those who also have other adverse practices in general, or are they a marker of poorer or less educated women rather than an additional contributor. Some is included here in the adjusted OR, but please spend a bit more time discussing and explaining this.

First, we have made revised the operational definition of the taboo and the food items included and excluded in the criteria are made clearer. Page 7, lines 10-49.

With regard to the issue “are the taboos actually among those who also have other adverse practices in general, or are they a marker of poorer or less educated women rather than an additional contributor”. Hoping we understood the point correctly, it has to do with ruling out the influence of third variables (or confounders) on the association of interest (taboo-anemia association). For example, and as you have said it, the taboo itself could be due to poor education. Also, the anemia could be due to poor education. It is also true with other variables. That means the association of taboo with anemia can be confounded by, for example, education status. However, there is a solution, controlling confounders, one method of which is multivariate analysis. In our work, the estimates we reported on the taboo-anemia association were adjusted (controlled for) covariates shown in table 3, including education status, income, etc. We did multiple logistic regression. Thus, the possibility that the anemia-taboo association might be confounded by education level, and other variables shown in table 3 too, was already ruled out. The statistical analysis section reflects the above, page 9, lines 4-10.

You also did not discuss whether you collected list of foods that replaced those foods that are avoided… e.g. do women replace raw meat with cooked meat?

First, with respect to raw meat, we didn’t consider avoiding raw meat as a taboo. We now have put the criteria in bullet points so that what was included and excluded would be clearer. Page 7, lines 10-49.

The comment on replacement is interesting though we did not collect data on it. We tried to find articles if replacement moderates the food taboo-anemia association, but could not find any. However, we intuitively share your point of view that it might influence the
outcome. Thus, we now have included the following statement as a limitation: page 17, lines 34-42.

“We did not collect data on the pattern of food replacement due to the PRFT. Thus, we could not examine whether the replacement, if any, affects the association of PRFT with anemia. Future researchers are encouraged to investigate the pattern of replacement as well as its influence on health in general and anemia in particular.”

The grammar is generally very good, but a few mistaken items such as "voidance" (abstract and later) and "green paper" (P9), and sentences that just don't quite say what they should

- These and other mistakes were corrected throughout the document.

Methods:

P5 L52-54: what is the cutoff used for anemia in these women? Stated later, but please pull forward to here where you talk about the study groups and their characteristics.

- Comment adopted by bringing the information forward, with some modification. Page 6, lines 18-59

P 6 L10: okay to use case and control, but its use in all following is sometimes confusing, particularly in things like tables that should be stand-alone. Perhaps use 'anemia' 'no-anemia' in more of the case-control discussions.

- The suggested comment has been adopted, including by providing a footnote for table 1 and using the phrases anemic and non-anemic individuals instead of cases and controls, in most expressions and throughout the document.

P6 L37-57: this section talks about ANC, but does not specify who collected the blood for Hb analyses; were these data from the hospitals, or did the survey team collect a separate sample and measure?

- The blood, as well as the urine and stool samples, were all taken and examined by the health professionals of the clinics. Thus, we did not process or hold any biological specimen. The results of the lab tests were used for this study as well as the hospitals’ own use. We now have made the statements clearer by including additional statements. Page 6, lines 18-37.

P6 L45-47: who uses the samples to check the clients' medical condition? The survey team or the ANC team?

- Addressed with the previous comment.
P7 L17: you say you did not include 'unsafe' foods, yet you included raw meat in the list of taboo foods. Raw meat is more "unsafe" than cooked meat, even if it is commonly consumed in Ethiopia.

- The statement at P7 L17 of the previous document read “Unsafe and medically proscribed food items were not included” … such that we did not consider ‘avoiding raw meat’ as a taboo.

- As the definition of taboo is updated in this revision, the issue of raw meat has been made clear. Page 7, lines 10-49.

P7: Did you ask women what they ate in place of the taboo foods? For example did they eat less meat because they avoided raw meat, or similar amounts of meat, but only cooked meat?

- Addressed above, with the first comment.

P7 L40: why were no 'non-poor'? please give some explanation of how these were calculated/ divided

- The income of participants was very low in absolute terms. Thus, we used the classification ‘poorest, poorer and poor’ in the previous document. However, we shared your view that the relative ranking of the participants would be more informative than our previous approach. Thus, we now have updated changed the wording into ‘low, middle and high-income categories. Done throughout the document. Page 7, line 57 to page 8, line 9.

P8 L30: what is the reason/ justification for selecting p<0.25?

- The comment refers to variable selection for multiple logistic analysis. Though there is still debate on the issue, the method we followed is by far the most widely used approach, i.e first bivariate analysis, then multivariate analysis using variables that demonstrate P ≤ 0.25 (or other relaxed p-values). The results of the final model are, however, evaluated at P<0.05. In case needed, we put here the following references


P10 L15: "cases were more educated…” you seem to be mixing which group is 'more educated', Table 2 seems to show that the controls (non-anemic) were more educated than cases (anemic)…”

- We have now corrected it as ‘cases were less educated’.

P10 L20-22: could be rewritten more simply… something like the following, as appropriate: In the second trimester there were more controls (38.3%) than cases (10.7%) (p-value?)…”

- Comment adopted by restating the statements as suggested.
Table 3: what was the purpose in including these data? Most are fairly common findings, and in the case of L56-58: the hematocrit is expected to fall during the third trimester due to hemodilution, this is not a finding worth noting. The rest must have a value to the paper to be included, …" Please explain in the methods and discussion: what is the value to this paper? Are these to demonstrate similarities to other populations? Are they identifying something else of interest? Don't just add because you ran the calculations.

- The covariates were used just for adjustment, to rule out the possibility that main association of interest, food taboo-anemia, was confounded by a third variable. As anemia is a multi-causal problem, any investigation between an exposure variable and anemia should adjust for the potential confounding factors. Like the other covariates, the stage of pregnancy might confound the taboo-anemia association, necessitating adjustment for it. In case needed we put here the following reference on multivariate analysis. Our statement in the method section that we used multiple logistic regression captures the above.


Discussion:

P13 L43: beef and lamb (rather than lamp)
- corrected

P13 L45-50: this is a complicated sentence and hard to figure out what you are trying to describe; please simplify

- The sentences have been restated

P13 L55: it is not appropriate to "presume" that a diet is poor just because there are taboos, particularly the ones you listed. It would be good to avoid raw meat during pregnancy if that meat could potentially be unsafe or if that meat is replaced with cooked meat.

- First, we did not say eating raw meat is safe, nor we included it in the taboo classification.

- Second, existing evidence shows food taboo and misconceptions influence dietary diversity and quality usually negatively than positively (we have included references in the manuscript). The food items most avoided by our study participants (meat, green leafy vegetables, lentil..) were of better iron profile compared to the items least avoided (wheat, corn, and sorghum). It was from perspective we stated that dietary quality and diversity would be presumed to be poor (low) in communities with pervasive food taboo.
Third, we have restated the statements, with reference included. The operational definition of the taboo has been also made clearer. Page 7, lines 10-49.

P13 L60: what "propositions"? do you mean these "findings"?

- Sentence has been restated.

P14 L7-9: which dark leafy vegetables? With bioavailability problems, it's hard to call these good iron sources... also when using comparative adjectives or adverbs, you always need to include the other side of the comparison "meat, legumes,... are of BETTER iron profile... THAN what... other foods consumed? ... than other taboo foods,... ?

- Dark green vegetable refers to items like spinach, lettuce, kale, and broccoli. We have also included it in the document. Page 10, lines 25-40.

- Though meat is the best source of iron (heme form), even dark green vegetables are among the good sources of non-heme iron and as well as vitamin c, which enhances iron absorption through the intestinal DMT. Some of the food items mentioned also enhance ceruloplasmin, another factor in iron bioavailability.

- The language comment has been addressed throughout the document.

P14 L27: please rewrite, to a more direct sentence; Are you trying to say that the proportion of anemia that is IDA is actually closer to one-quarter than to one-half?

- Yes, and the statement has been restated to convey the main message that the contribution of IDA to the burden of anemia is not as high as the previously presumed figure. Page 15, lines 34-37.

P14 L32: the national food consumption survey report would be a more appropriate reference, covering all of Ethiopia

- Reference provided

P14 L39: you only have a few items avoided that are iron rich, you cannot lump them all together, especially because

- Addressed with a previous comment and as can be seen in figure 2, the items avoided are (meat, green vegetables, lentil..) and the less avoided were cereals. The comparison was made from that perspective.

- The statements have also been restated in this revision. Page 15, lines 9-17.

P14 L42: what is the "assumption"?
It was referring to the proposition stated in preceding the sentence. As, the other reviewer has also recommended expanding this section, a half page detailed information has been included. Page 15, line 50 to page 16, line 22.

P13 L47-50: Could you please add some suggestion about how you envision ethically conducting a study that would assess causality? If you have none, please adjust your references to this here and later

- We wrote as the design of our study, case-control, precludes making causal inference, which doesn’t necessarily translate to recommending assessment of causality, which needs RCT design. We believe conducting RCT studies on the topic would be unethical. Thus, we suggested prospectively designed cohort designs, which would enable establishing a temporal relationship and also evaluate risk directly. Case-control design doesn’t enable establishing a temporal relationship and we can calculate only odds ratio, not risk ratio.

- As to include suggestions for better design, we have included the following statement in the revised document. Page 17, lines 12-17.

"The study design, case-control, precludes making causal inference or ruling out reverse causality. Prospective studies, like cohort, would be more informative than case-control studies to reach into a better conclusion."

P14 L52: less than what?
- Corrected

P14 L59: again, please simplify … for your double negative: "not non-existent" are you trying to say that there ARE dieticians in the system?
- Corrected

P15 L4: "less doable": can you find a simpler way to express this, and remove the "less" unless you have a comparison term "less doable than…” and 'less doable' by whom? By the health workers, by women who receive the counseling?...
- The word has been replaced.

P15 L19-21: based on what proof do you have that pregnant women are receptive to nutritional advice and to changing their diets? Their adherence to taboos is not listening to nutritional advice.

- First, two references have been added again in this revision. Page 16, line 51-54.
- Second, our statement “pregnant women are more receptive to nutritional advice than non-pregnant ones” was used to mean their receptiveness and willingness to change
dietary behavior during pregnancy is an opportunity to incorporating nutritional counseling.

P15 L31: "exiting PRFT from the rank of neglected…" double negatives tend to be confusing, particularly when you are trying to push a point. Direct is much easier to get across your message "…draw PRFT into the ranks of PH problems that are being addressed…"

- Statement has now been restated as advised.

P15 L46-49: of course women who attend ANC are different than those who do not attend ANC.

- Though it is most likely they would be different as you said, we could not still be certain as we did not assess it. It is because of this we used low toned statements.

Please clarify what you mean. … the PRFTs of women who do not attend might be different…?

- Statement has now been restated as advised.

P15 L56-59: could you please clarify this by rewriting more simply?

- Statement has now been restated as advised.

P16 L17-22: requires clarification. As above, what ethical method are you proposing. Instead, it seems you could delve more into other factors surrounding PRFT, or whether some PRFT have more impact than others, or what are the biologically plausible pathways, or what are the replacement foods, for example is raw meat just replaced by cooked meat? Note that raw meat could do harm so should be avoided during pregnancy… please address this

- Issue has been addressed as advised.

- And, we thank you again very much your comments, for the time and effort you put to improve our work.

Reviewer #2:

Dear Reviewer,

- We are very grateful for your comments, which helped us in improving the manuscript. We have entertained and addressed all comments provided and revised the manuscript accordingly. Please find details of our response and changes made, provided in bullet points in front of the comments.

you are conducting a very contemporary research idea and you have done a good job but some issues are not getting attention and some variables are measured in the inappropriate way so you have to reconsider it
We have addressed the issues with measurement and revised the document accordingly.

Associate editor:

Dear Editor,

We are very grateful for your comments, which helped us in improving the manuscript. We have entertained and addressed all comments provided and revised the manuscript accordingly. Please find details of our response and changes made, provided in bullet points in front of the comments.

In general the manuscript is well written, however as highlighted by the reviewers the article requires thorough review of the language before it is acceptable for publication.

Introduction:

Please could the authors be more specific in describing the aims of the paper. It is not clear what is meant by the 'magnitude of PRFT' or 'drivers' for this? It would help the flow of the paper if the authors numbered the aims and are more specific about what they are. Then the results and discussion sections can be structured to address each of the aims in sequence

- Magnitude refers to the prevalence of PFRT among the anemic as well as the non-anemic individuals. Drivers refer to the underlying factors leading to practicing the taboos.

- We have now revised the objectives and made them clearer. We have also followed the order of the objectives in the subsequent parts like result, discussion and conclusion. Page 5, lines 25-30.

Methods:

Please could the authors describe the way in which PRFT were collected in more detail - provide an example of the questions used.

- Comment incorporated by providing the information requested, making clear the operational definition and giving examples. Page 7, lines 10-41.

Furthermore in the analysis section please could the authors describe the PRFT variable and how the data collected were used to calculate the final variable e.g. was the variable binary 'yes' versus 'no' or where the types of foods restricted used to calculate a score which represented food avoidance?

- PRFT was a yes/no dichotomized variable, and that is why we used logistic regression
- Comment incorporated by adding statements about PRFT measurement and categorization into yes/no. We have also provided the criteria of PRFT. Page 7, lines 10-41.

Results:

What is the food item 'green-paper'? This needs describing for an international audience

Please could the authors be more specific about 'organ meat' as organs such as liver are not recommended to be consumed during pregnancy due to the high concentrations of vitamin A in liver meat (which can be toxic to the fetus) - therefore the avoidance of liver would come under food safety not taboos and should be excluded from PRFT. The same is true for raw meat.

Please could the authors quantify their household income categories and refrain from referring to them as 'poor', 'poorer' and 'poorest' this need to be provided in context to the rest of the country.

- Green chili pepper was wrongly spelled as ‘green-paper’ and has now been corrected.

- The criteria for PRFT has been made clear by restating the section: On the items classified as food taboo: we stated in the previous document that “Unsafe and medically proscribed food items were not included.” This includes raw meat and liver. There were also a few cases who reported not eating wheat, barley, oats due to celiac disease. We now have addressed the comment by updating the PRFT operational definition. Page 7, lines 10-49.

- Classification by income: wording has been changed into ‘low, middle and high categorization’ based on the relative position of the individuals as compared to the other individuals included in the study. Page 7, line 57 to page 8, line 9.

Discussion:

It is of interest that iron supplementation was not associated with anemia but PRFT was. Please could the authors expand on this, is iron supplementation routinely prescribed to those with anemia in Ethiopia?

- We now have provided some justifications for the lack of association between iron supplement use and anemia. Page 15, line 50 to page 16, line 22.

- Generally, the case of anemia in Ethiopia is unique and may not be captured by the conventional iron causation frameworks. Anemia among Ethiopian women has been described as a rare by some researchers. Studies are emerging that show that iron deficiency is not a major problem in Ethiopia. Some genetic factors have also been implicated to play a role in the anemia situation in Ethiopia. Besides, the validity of the
current WHO hemoglobin cut off points for Ethiopian situation is being under investigation.

- And, we thank you again very much your comments, for the time and effort you put to improve our work.

https://www.who.int/nutrition/callforauthors_anaemia_status/en/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5955722/


Gebreegziabher T, Stoecker BJ: Iron deficiency was not the major cause of anemia in rural women of reproductive age in Sidama zone, southern Ethiopia: A cross-sectional study. PloS one 2017, 12:e0184742.