Author’s response to reviews

Title: Food consumption and undernutrition variations among mothers during the post-harvest and lean seasons in Amoron'i Mania Region, Madagascar

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Reviewer reports:

Ayalew Astatkie, Ph.D. (Reviewer 1): Manuscript title: Food consumption variation and undernutrition incidence of mothers according to the season in Madagascar [PUBH-D-18-04053R2]

Major Compulsory Revisions

- The description of the sample size estimation and sampling procedure is mixed up. It must be re-written coherently. First describe clearly in one paragraph about how sample size was estimated. Then state how sampling was done to obtain the required sample size.

Corrected

- While the present study is a cohort study, the sample size calculation was done for a prevalence study which doesn't meaningfully yield a sample size for incidence. It is also difficult to judge whether the sample size has enough power to detect factors associated with undernutrition. Therefore, the authors need to present clearly how sample size was
estimated. At least a post-hoc power analysis should be done to see if the study has enough power to detect factors associated with undernutrition.

Post-hoc power analysis was in the discussion, it is transferred to the sampling section.

- In the description of the variables of the study, the authors should clearly distinguish between the dependent and independent variables.

Corrected

- The authors stated that, "Food consumption frequency was categorized into 2 groups: no or less than once a week consumption and consumption more than once a week." Into which category does "consumption only once a week" fall?

Consumption only once a week is in the category “once or more than once a week”: Corrected.

- An appropriate measure of effect for a cohort study is the risk ratio (RR), not the odds ratio. Hence, the authors need to use an analysis method appropriate for the study design. They may use Poisson regression or convert the odds ratios from logistic regression into RR using Stata's "oddsrisk" command.

Corrected, Risk Ratio is used.

- Notwithstanding the above comment, if the authors are to retain their use of logistic regression, then the use of the backward stepwise technique doesn't seem a good choice as it is an automated procedure and doesn't give enough room for human reasoning. Hence, I recommend the use the "Enter" or "forced entry method". For additional information, please refer to the article by Bursac et al: https://scfbm.biomedcentral.com/articles/10.1186/1751-0473-3-17. Besides, as one of the aims of the study is to evaluate the effect of season, season should be entered into the multivariable model as an independent variable.

We want to identify factors that lead to the deterioration of the nutritional status between the two seasons (well-nourished in post-harvest season and undernourished in lean season). So, we are decided to analyze undernutrition incidence. We have well-known references to the possible determinants of undernutrition in women, but we have no reference and publication concern the determinants of this degradation during the lean season. Therefore, we chose an exploratory type of analysis. But for your request, we have chosen as hypothesis that the profile related to the reproduction and the socio-economic factors could favor this degradation.

Regarding the seasonal effect, we chose the incidence of undernutrition (undernutrition in post-harvest season/undernutrition in lean season) as indicator, include seasonal as dependent and independent variable seems irrelevant.
- The results on "factors associated with undernutrition" should be revised in line with the comments given in the methodology section. Also, merge tables 2 and 3 such that both the unadjusted and adjusted effects are shown in the same table.

The results of the "factors associated with incidence of undernutrition" are changed taking into account the hypothesis tested. However, the factors significantly associated with the incidence of undernutrition have not changed between the exploratory analysis that we had previously and the model adopted now (although we tried to test several models).

Table 2 and 3 are merged

- The discussion section needs to be updated based on any re-analysis of the data as per the suggestions above.

Analyses showed the same factors (same variables identified: movable possession score and use of toilet). We added discussions about the model.

- In the last paragraph of the discussion section, the authors argue that "Because of the high undernutrition's incidence for pregnant women, we considered pregnancy as a determinant of the deterioration in nutritional status during the lean period". This argument is based on the authors' intuition and not substantiated by their findings. Only results substantiated by the data should be discussed.

The comparison of the incidence of undernutrition (based on MUAC) among pregnant and non-pregnant women was analyzed. The results showed a high incidence of undernutrition in pregnant women. We added the value of the RR adjusted for this comparison in the result.

- Any limitations of the study should be discussed.

We added discussions about the validity of our sample and other factors that will have to be taken into account to study undernutrition in women, mainly energy balance and health.

- Conclusion should be based on the results. The conclusion about pregnant women is not based on the data.

Conclusion about pregnant women is based on the results (RR adjusted added).

- The manuscript needs careful and thorough language revision.

Realized
Minor Revisions and Concerns

- In the title replace the preposition "of" with "among" such that it reads as "… incidence among mothers …"

Title is changed according to the proposition of the second reviewer.

- The authors refer to the DHS results of 2009 when arguing about the status of malnutrition in Madagascar. Is there no DHS result after 2009? If there is one, better to update the argument accordingly.

There was no DHS after 2009

- In the data collection section (page 5, line 119), cite reference to the "Food Frequency Questionnaire".

Two references were already cited for the establishment of food frequency questionnaire used for the study (ref 18 and 19)

- Better not to number the sub-headings in the results section.

Corrected

- In the results section, under the "description of the sample", the comparison of the lost-to-follow-up with those remaining in the study is ambiguous. It needs rewriting.

Revised

- Revise the sub-heading "Factors associated with undernutrition's incidence" as "Factors associated with undernutrition".

Results concern factors associated with undernutrition’s incidence. The first study conducted as base-line at the beginning (post-harvest season) stated "Factors associated with undernutrition" (reference). This study is specifically for undernutrition incidence according to seasonal variation.

- Better to omit the p-values from the tables and the text in the abstract.

p-value is removed

- Avoid the use of very long paragraphs in the discussion section.

Revised

- In Figure 2, the x- and y-axes should be properly labeled.

Corrected
Samson G Gebremedhin, PhD (Reviewer 2): The study assessed the relationship between seasonality (post harvest or lean season) and women's nutritional status. While the findings do not add much new to existing body of evidence, the study had been conducted with acceptable level of quality and presented the findings in clear and cohort manner. The study has also provided a clear picture how the dietary pattern varies during the production and lean seasons. However, the study has serious limitations in terms of data analysis including failure to adjust for potential confounders while assessing the association between season and nutritional status. I have summarized my comments section-by-section.

Title and abstract

* I recommend rephrasing the title as "Food consumption and undernutrition variations during the post harvest and lean seasons in Amoron'i Mania Region, Madagascar"

Corrected

* In the abstract section, please mention the exact duration of follow-up of the study in months

Added (7 months)

Please also provide adjusted odds ratio with 95% CI for the variable "pregnancy"

Added

Methods section

* Study setting section: Please be explicit about "national poverty line". Please also give information about the average land holding in the study area.

Added: national poverty line (<1,1$ Purchasing Power Parity, PPP)

Added (median land holding in the study area = 0.4 hectares per household)

* The authors used food frequency questionnaire with 3 months reference period to assess pattern of food consumption in the two seasons. It seems the reference period (3 months) is very wide and the collected data may not exactly show the dietary intake in a given season. I think the possibility of over- or under-estimation of the level of dietary consumption should be described in the discussion section.

May be 3 months is very wide, but it refers on the situation of the region. In lean season, consumption of foods like meat is rarely and period of one moth or less can’t give the real situation.
Page 6, line 123: it is not clear how the DDS score was calculated in the study. Further, in the results section there is no description about the dietary diversity of the study subjects.

In this study, DDS didn’t use or calculated. We mentioned only in this line that to establish the list of foods for consumption frequency, we had used the list of foods to calculate the DDS and list of foods frequently consumed in the region.

The authors stated that "Food consumption frequency was categorized into 2 groups: no or less than once a week consumption and consumption more than once a week.” Was there any strong reason for selecting this cutoff point?

The choice of this cutoff point was based in the frequency of consumption in the region. For example, if we take a cutoff “once a day”, almost all of the population were in one group.

The assessment of household economic status should also considered size of agricultural land the household owned.

We didn’t get the information about agricultural land. The mothers didn’t have valid information about it.

While assessing factors associated with incidence of malnutrition, it is not clear how candidate variables were selected for the multivariable analysis.

Added (Variables with p-value <0.20 in bivariate analysis were selected for the multivariable analysis)

Results section:

Line 183: rather than classifying water sources as "safe" or "unsafe" it might be better to use a more standard approach of classification into: "improved" vs "unimproved" water sources. Please consider the WHO/UNICEF operational definition for "improved" vs "unimproved" water sources.

WHO classification was used. Safe or unsafe is changed on "improved" vs "unimproved"

Line 214: "Among 110 undernourished mothers, 16 became well nourished at the end of the follow-up”. Please provide the % with the frequency.

Added: %

The authors described that systematic differences were observed between retained and lost to follow up subjects. Accordingly, while assessing the association between seasonality and nutritional status, these unbalanced variables should be adjusted.
The two variables that differences were observed (movable property possession score, and toilet possession) are already in the model.

* Please display both the frequency and percentage of the observations across all the tables.

Corrected

* It's not clear whether the OR presented in table 2 is a crude or adjusted.

Corrected

* Table 2: I don't think the variables "Movable property possession score", "Farm animal possession score" and "Farming equipment possession score" are needed there. I assume that these have already been included in the household wealth index variable.

There is no household wealth index variable. The “Movable property possession score represente le plus le household wealth. Ainsi nous avons retenu cette variable et laisser les deux autres.

* Table 2 and 3 present list of variables that predict nutritional status of the study subjects. I think season (post-harvest or lean) should be included in bivariable and multivariable models and the association (between seasonality and nutritional status) should be adjusted for the other independent variables indicated in table 3.

We can compare the prevalence of undernutrition of both seasons. But we would like to present the results concerning the incidence analysis because the purpose of our study is to explain why well-nourished women become malnourished? It is a question of choice in relation to our objective because we want to propose suggestions for this group of women.

* Please also integrate table 2 and 3 into one table.

Corrected

* As I tried to comment earlier during the first submission of the manuscript, the study involved two repeated measurements from the same set of individuals and the observations are not independent. Hence the data should be not analyzed using the usual logistic regression analysis and instead models like mixed effects logistic regression or generalized estimation equation approach should be considered.

Multivariable used the extension to the binomial family of Generalized Linear Model (GLM).

* Its not clear how "pregnancy" turned out to be significant predictor of malnutrition because the variable has not been included in the multivariable analysis and pregnant women were excluded from the endline survey.
Pregnant women wasn’t included at the beginning of the study but mother who became pregnant during the follow-up were not excluded. So we have the nutritional status of them at the end of the survey (according to MUAC only).

We decided to analyze pregnancy separately because MUAC is the one indicator of undernutrition we used to measure incidence of undernutrition for pregnant women. For non-pregnant women, we used both indicators: BMI and MUAC.

Discussion

* Line 213-4: Please move the description about the post-hoc power calculation to the methods section.

Corrected

Typos

* Abstract: Provide the expanded form of each abbreviation the first time it appears

Corrected

* Abstract: green leaves --> green leafy vegetables

Corrected