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 and undernutrition variations during the post-harvest and lean seasons in Amoron'i Mania Region, Madagascar".

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- The authors didn’t provide a convincing justification as to why they used a sample size estimated for a prevalence study while theirs is an incidence study.

  → The main goal of the cohort study was to estimate the incidence of undernutrition. As we had no reliable data for the two seasons for the region and for the country, we didn’t estimate a simple size for the cohort part of the study. With an hypothesized prevalence of 27% and the sample of 600 women, we thought we had about 450 women in good nutritional status, and this sample should allow us to estimate the incidence with an adequate precision (3-4% for an incidence of 10%).
The description of the dependent variable still does not explicitly clarify what the dependent variable(s) is/are. For example, is "food consumption frequency" a dependent variable? Is undernutrition as measured by BMI a dependent variable? I couldn't see any such results.

→ We added more explanation in the analysis to clarify this situation.

Result about food consumption frequency: line 208

Result about undernutrition: prevalence: line 218, and incidence: line 230

- In response to my earlier comment about including "season" as an independent variable affecting food consumption and undernutrition, the authors responded that doing so would be "irrelevant". Yet, in the first sentence of the discussion, the authors claim that "Our study shows the effects of season on the frequency of food consumption and nutrition status of a representative sample mothers in Amoron'i Mania region." Also the first sentence of the conclusion states that "This study highlights the importance of the seasonal variation in food consumption, and the increase in the incidence of undernutrition in the lean season." There are similar claims in the background sections of the abstract and the body of the manuscript. The preceding claims by the authors are unwarranted if "season" is not treated as an independent variable in the multivariable model and unless its confounder-adjusted effects are unraveled.

Furthermore, comparison of undernutrition in the post-harvest and lean seasons using McNemar's test yields only a crude (confounded) result. Any claims about the effect of season should be based on a confounder-adjusted analysis.

→ We specified that we could not include the seasonal variable in our model of analyzing the incidence of undernutrition. We studied well-nourished women at the beginning of the study, the incidence of undernutrition for post-harvest period = 0%. The variable can be included if the analysis concerns the prevalence.

Incidence post-harvest season = 0.0%

lean season = 12.2%

→ As incidence of malnutrition was our goal, we didn’t deepen the paired analysis by performing for example multilevel analysis.

- The use of Pearson's chi-square test to investigate the effect of season is also not recommended as it doesn't adjust for confounders.

→ The Chi² test was used in bivariate analysis along with the crude RR’s (proportion comparison between exposed end unexposed). We used a multivariable model (GLM) to obtain adjusted RR’s and the corresponding tests.
- The authors should provide brief details of "the extension to the binomial family of Generalized Linear Model (GLM)" they used. It is worth describing the model building and refinement procedures. The authors should also state the link function used.

→ We have specified the link function used in GLM. The new sentence is “To obtain adjusted RR, we used a multivariable Generalized Linear Model (GLM) with log link and binomial distribution”.

- In Table 2 the authors should provide the adjusted RR for all independent variables even if the effects are not statistically significant.

→ We presented the results of all variables in the multivariate model (5 variables in total) even the effects are not significant (educational status, birth interval, household size).

- Include the effect of pregnancy on undernutrition in Table 2.

→ Effect of pregnancy on undernutrition used MUAC only as an indicator and concern pregnant and non-pregnant women. In Table 2, both BMI and/or MUAC were used and analysis concern non-pregnant women. Adjustment variables are also different.

- The heading in Table 2 should clarify whether the undernutrition is as measured by MUAC, BMI, or other means.

→ Added (BMI and/or MUAC)

- Incidence is an aggregate-level measure. What the authors investigated is not the factors associated with the incidence of undernutrition. They investigated the factors associated with undernutrition at individual level. Hence the title "Factors associated with the incidence of undernutrition" (page 10) should be corrected.

→ Corrected

- Are the results about factors associated with undernutrition in the abstract and the body of the manuscript based on BMI or based on MUAC? Should be clarified.

→ Added

- In the last sentence of the "study setting" use dot (.) not comma (,) as a decimal separator.

→ Corrected

- The discussion section is mainly a repetition of the results. The findings have not been properly interpreted, mechanisms have not been sufficiently discussed and implications have not been elaborated.
Corrected. We reduced to a few sentences the recall of the results. We deleted, added, and moved sentences and all these changes are not highlighted in the text.

- The highlighted paragraph on page 13 (lines 297 to 304) does not seem to be of any relevance.

→ Deleted

- The population (i.e., "mothers") should be indicated in the title of the manuscript.

→ Added

- The manuscript still needs careful language revision (grammar, typos, punctuation).

→ Manuscript was revised by an anglophone (American)

Samson G Gebremedhin, PhD (Reviewer 2): Reflect the findings of the multivariable analysis to the conclusion sub-section of the abstract.

→ Added

In the multivariable analysis (Table 2), please include "season" as a potential predictor of undernutrition.

If we include season

Incidence post-harvest season = 0.0%

lean season = 12.2%

RR=??