Author's response to reviews

Title: On exploring and ranking risk factors of child malnutrition in Bangladesh using multiple classification analysis

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Author's response to reviews:

Dear Pierluigi Marzuillo
BMC Nutrition

Subject: Submission of Revised article NUTN-D-16-00114R1

Dear Sir/Madam,

Many thanks to the reviewer and the editors for their valuable comments and directions. We have followed the reviewers’ directions to modify and revised our manuscript "On exploring and ranking risk factors of child malnutrition in Bangladesh" (NUTN-D-16-00114R1). The responses are given below with the comments of the reviewers.

Reviewer reports:

Dianjianyi Sun (Reviewer 3): In the revised manuscript, the authors added additional contents regarding this topic. However, the current updated version was still with a focus on the multiple classification analysis (MCA), compared with linear and logistic regression analyses. Please double check the explanation for the abbreviations when they first occurred.

Response: We have checked the explanation for the abbreviations when they first occurred.

Abstract

Structured abstract is needed with separate paragraphs, not as a whole paragraph.

Background in the abstract is too long, its need to be shortened into one or two sentences.
Response: The abstract is divided into several paragraphs as suggested. A paragraph is created under the heading of “Objectives”. The background is now in two sentences as below:

“Background: Logistic regression analysis is widely used to explore the determinants of child malnutrition status, a nominal scale variable determined from an interval scale anthropometric measure, using nominal-scale explanatory variables mainly for two reasons: (1) nominal response variable, and (2) lack of linear relationship between anthropometric measure and nominal-scale predictors. Multiple classification analysis, a multivariate technique, relaxes these assumptions and additionally prioritizes the predictors.”

The objective paragraph is as below:

“Objectives: The main objective of the study is to show how does the multiple classification analysis perform like linear and logistic regression analyses for exploring the determinants and ranking them.”

Background and Discussion

1. The "Background" section still need to be simplified into its 30~50%. The deleted part could be reorganized into your discussion part.

Response: Instead of deleting any parts, we have reduced the background of its about 25% (699 from 933 words). As a result, we don’t need to reorganize any part in the discussion section. Also, I deleted one reference, which I feel redundant. I hope, now the background is more concise than before.

Methods

1. You may delete "Linear Regression Analysis".

Response: We are comparing IS-MCA with linear regression analysis and so we think it’s better to discuss in brief in the paper (though it is well known) with some additional points. We have shortened the paragraph as well.

2. The "Study Materials" should be put at first.

Response: Shifted the "Study Materials" sub-section as per suggestion.

Results

1. The author need to add a table describing the characteristics of study population.
Response: Since we are mainly focusing on model comparisons using the same study population
used in the Bangladesh Demographic and Health Survey (BDHS), we were not interested to
include an extra table which will be very similar to the BDHS report. The inclusion of a large
table with its explanation in results section will increase the volume of the paper. So, we think
it’s better to refer the 2011 BDHS report by NIPORT et al. (2013) instead of adding a new Table.
At the end of the first paragraph of the “Study Materials” sub-section, we have added a line as
below:

“The characteristics of the study population are detailed in the 2011 BDHS report [21].”

Also, note that in Table 1, we have shown the distribution of the children according to their
background characteristics.

2. The 1st paragraph of "Goodness of the Fitted Models" should be placed in the end.

Response: We replaced this sub-section at the end of the Results section. However, I mentioned
at the beginning of the Results section that all the considered variables are found significant in
the fitted models.

3. In table 1, if the unadjusted mean predicted HAZ (UPM) from IS-MCA was reported, why
an unadjusted estimated regression coefficient of LM was not reported?

Response: The consideration of showing both unadjusted mean predicted HAZ (UPM) and
adjusted mean predicted HAZ (APM) was to show how the MCA provides simultaneously both
unadjusted and adjusted results, which are also related with eta and beta statistics which provide
the priority index of the explanatory variable before and after the adjustment of other predictors.
Also, the table shows how the results are affected by the influence of other predictors. The
impact is clear for the “place of residence” explanatory variable – mean/proportion is found
smaller in urban residential area but the results reverse when the other variables are included in
the model. For calculating unadjusted regression coefficients, we need to run the linear
regression analysis considering all the explanatory variables separately.

However, according to reviewer’s suggestion, we have deleted the UPM and UPP from Table 1
and Table 2. Also, we have removed the UPM and UPP from the respective places. And we have
changed the line regarding Rural-Urban differences where the UPM statistics were used only as
below:

“However, the unadjusted predicted mean HAZ (Urban: -1.46 SD and Rural: -1.76 SD) and
unadjusted predicted proportion of stunted children (Urban: 35.23% and Rural: 43.07%)
obtained from IS-MCA and NS-MCA models respectively are found lower in urban areas.”

4. I suggest delete unadjusted mean predicted HAZ (UPM) from IS-MCA in both Table 1 and
Table 2.

Response: We have done according to reviewers’ suggestion.
5. Again, statistical models (LM, BLogM, IS-MCA and NS-MCA models) are only the tools for your study. Showing the consistent findings confirmed by all the models is enough, no need to repeatedly reported the same finding from different models.

Response: The models provide results with different aspects. LM provides how much change in HAZ, BLogM provides how much change in logit or ORs, IS-MCA provides mean HAZ for the categories of each explanatory variables, and NS-MCA provides proportion of stunted children. Since one of our goals is to compare the results of the fitted four models, we have tried to maintain such comparisons. According to reviewer’s suggestion, we have tried to off from explaining all aspects of results for all variables separately. We have reduced the sub-section “Significance and Association of the Explanatory Variables with Child Malnutrition” of its about 10%.

6. Please delete "These predictive powers are low as expected found in the relevant nutrition studies [14,35,40], and the other goodness-of-fit tests confirm the appropriateness of the fitted models."

Response: Deleted as per suggestion. As a result we have to delete the reference [40] as well.

7. Where is the note and border line for Table 3?

Response: Border line is given and a note is given for eta and beta statistics.

8. Keep consistency with how many digits to the left of the decimal.

Response: We are not clear about this comment but we have checked the consistency in the decimals table by table.

Discussion

1. Way too much contents are relate to MCA in 1st paragraph. In addition, the 1st paragraph should be a brief summary of your major findings.

Response: It seems much contents relate to MCA but actually we compare the linear and logistic models with MCA models how they actually comparable.

From the first paragraph, the first two lines have been deleted and started what the article has attempted and what results are observed. The paragraph is now as below:

“The study has attempted to identify the risk factors of child malnutrition considering both interval-scale nutrition measure and nominal-scale nutrition status, and then rank the risk factors based on a priority index via MCA. The findings of the study clearly indicate that the MCA models provide results comparable to those of linear and logistic regression analyses. In case of exploring significant predictors, all the fitted models behave in the same line and show that all the assumed predictors are significant. The fitted models provide similar information in different
ways such as: linear and logistic models provide respectively the mean change in HAZ and the risk of being malnourished for a specific group compared to a reference group, while the similar interpretation can be made from MCA by comparing the APM of HAZ and APP of stunted children for a compared group with those statistics of the reference group. The ORs from BLogM and the APPs from NS-MCA model are positively related as the higher the OR of a group, the higher the corresponding APP. It can be said that the APMs can be calculated from the fitted LM and an approximate ORs can be calculated from APPs of NS-MCA model.”

After this paragraph, predictor specific discussion has been placed.

Regards,

Kakoli Rani Bhowmik and Sumonkanti Das