Author's response to reviews

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

Authors:
Kakoli Bhowmik (kakolistat@hotmail.com)
Sumonkanti Das (sumon_148@yahoo.com)

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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 the 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, I believe the author still focused on the comparison between multiple classification analysis (MCA) with linear and logistic regression. Additionally, there were still many issues needed to be addressed before publication.

1. As the authors focused on comparisons between statistical methods, I suggested the tile of this manuscript could be changed into "Using multiple classification analysis on exploring and ranking risk factors of child malnutrition in Bangladesh".

Response: We changed the title as “On exploring and ranking risk factors of child malnutrition in Bangladesh using multiple classification analysis”.

2. In the abstract, too much on "Background" while too little on "Results".
Response: We have modified the abstract section by decreasing “Background” and increasing the “Results” sections. The sections are below:

**Background:** Logistic regression analysis is widely used to explore the determinants of child malnutrition status mainly for nominal response variable and non-linear relationship of interval-scale anthropometric measure with nominal-scale predictors. Multiple classification analysis relaxes the linearity assumption and additionally prioritizes the predictors.

**Results:** The fitted multiple classification analysis models show similar results as linear and logistic models. Children age, birth weight and birth interval; mother’s education and nutrition status; household economic status and family size; residential place and regional settings are observed as the significant predictors of both Height-for-age Z-score and stunting. Child, household, and mother level variables have been ranked as the first three significant groups of predictors by multiple classification analysis.

3. The background needs to be shortened in only one page.

Response: We have tried to reduce as much as possible. Now Background is now in three paragraphs covering below one and half pages. If one page is mandatory, the 1st paragraph can be removed from the “Background” section which inform about stunting scenario in national and international levels. If editor suggest something like this, we will do this.

4. In the "Method" section the 1st paragraph should be merged into the "Multiple classification analysis", or moved in the end of the "Method" section.

**Method:** The first paragraph is merged with the sub-header “Child Nutritional Status” under the “Method” section. The section now provides the nutrition indices, nutrition status and mathematical notations for defining and denoting the linear, logistic and MCA models (LM, BLogM, IS-MCA, NS-MCA). After this, three statistical methods (linear regression, logistic regression, and MCA models) have been set up.

6. How did the researchers collect the information of "explanatory variables", regarding of variables at children level (age, birth weight, and birth interval), mother's level (education and nutrition status), household level (wealth status and family size), community level (rural and urban areas), and regional level (division)?

Response: A new sub-header has been created “Explanatory Variables” before “A number of explanatory variables at children level (age, birth weight, and birth interval),”.

One line is added in the paragraph as:
“The household and community information were collected from the household head, while children and mother’s information were collected from the mothers.”

This sub-header has been set up at the last of the Method Section.

7. A sub header of "child nutritional status" should be added before "In 2011 BDHS data, the three anthropometric indices HAZ, WAZ, and WHZ are calculated ……".

Response: We have created the sub-header and some other information are added under this sub-header already discussed in 4.

8. In addition, three paragraphs of "Linear Regression Analysis", "Logistic Regression Analysis", and "Multiple classification analysis" needs to be shortened in two pages.

Response: We have shortened these subsections into two and half pages. Further reduction of the paragraphs may be too difficult in the sense that discussion of the statistical methods become very poor. In terms of word, these three sub-section consists of now 782 words reduced from 1151 words (about 32% reduction).

9. The "Results" section needs to be shortened into 30%~50%.

Response: What we believe that the “Results” section can be shorten only under the sub-section of “Significance and Association of the Explanatory Variables with Child Malnutrition”. Thus, we tried to shorten this sub-section, which has been shorten to 548 words from 759 words (about 28% reduction).

Overall, in terms of shortening the paper, it is now very tough job to accommodate the main findings of the study and maintain the quality of the paper. We have deleted several literature review on child malnutrition in the “Background” section and hence some references are also deleted. As a result, the main manuscript is now 17 pages. So we are requesting further revision only for improving the quality of the paper not for shortening the paper. Please try to consider these issues for further revisions.

Regards,

Kakoli Rani Bhowmik and Sumonkanti Das