Reviewer’s report

Title: Application of ordinal logistic regression analysis in determining risk factors of child malnutrition in Bangladesh

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Reviewer: M.G.M. Dr. Khan

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In this paper the authors have made an attempt to develop a technique using an ordinal logistics regression (OLR) for determining the risk factor of child malnutrition in Bangladesh. Using the data of Bangladesh Demographic and Health Survey 2004, the authors categorize the child nutrition status, based on anthropometric index, into three ordinal groups: severely undernourished (<-3.0), moderately undernourished (-3.0 to -2.01) and nourished (# -2.0) to assess the several child malnutrition risk factors such as age of child, birth interval, mothers’ education, maternal nutrition, household wealth status, child feeding index, incidence of fever, and ARI & diarrhea.

Then, an OLR model, namely, proportional odds model (POM) is proposed instead of using the traditional separate binary logistics regression (BLR) models to find predictors of both malnutrition and severe malnutrition, if the proportional odds assumption is satisfied. When the assumption is violated, a partial proportional odds model (PPOM) can be used as an alternative to POM. Thus, using these three fitted models for the data, the authors find that the results for POM and PPOM are comparable with those BLR models. Therefore, the ordinal logistic regression (OLR) can be regarded as an alternative method of determining the risk factors of child malnutrition.

In this paper, the authors address the problem of determining the malnutrition predictors successfully by proposing the alternative methods of BLR. The paper could be useful in nutritional survey design and is well suited to the aims and objectives of the Nutrition Journal.

Although, the OLR is being used frequently in the literature, I believe that the authors’ approach to the problem in this paper is interesting and their contribution is of sufficient merit. Thus, I recommend the paper for publication subject to the incorporation of the following:

1. From the results of POM and PPOM, the authors claim that all the variables considered in the study are significant predictors of child malnutrition. But they didn’t justify about the low value of R2 in the Table 2 (R2 = 0.1029) and Table 4 (R2 = 0.1029), which mean that only 10% is explained about the malnutrition that is caused by these predictors.

2. The necessary descriptive statistics including the sample size of covariates with ordinal outcome in terms of malnutrition status can give better picture of using
ordered logit. This is missing and it will be good for the readers, if some descriptive analysis with a table is added.

3. The graphical method to assess the validity of parallel slope assumptions can also be provided.

4. As the confidence interval (CI) is more informative than p-values, it is good if Table 3 includes the confidence intervals for odds ratio.