Reviewer’s report

Title: Country Characteristics and Acute Diarrhea in Children from Developing Nations: A Multilevel Study

Version: 2 Date: 31 October 2014

Reviewer: Rachel Burke

Reviewer’s report:

Report – diarrheal illness countries

Overall, this is an interesting article with a thoughtful design and generally well-done analysis. However, there are several major analytical questions that should be addressed / clarified prior to publication.

Major compulsory revisions

1. Please justify the use of the missing indicator in the birthweight variable. Use of a missingness indicator has been shown to create a selection bias. Therefore, I would recommend leaving these values as missing and then either utilizing multiple imputation or other methods of simulation to conduct a sensitivity analysis.

2. The statistical analysis section requires clarification. By “hierarchical linear modeling Bernoulli regressions” do you mean mixed effects logistic regression? If so, utilize this terminology, as it will be more familiar to the reader. If not, then report a source for this type of model for the interested reader. In lines 141 – 147, it is unclear if you ran different models, or used the same model to calculate different effects.

3. In the Methods section, lines 148 – 149, clarify data weighting. Were data weighted to be representative within countries, or also across countries? If within countries, then it doesn’t seem appropriate to report simple proportions in Table 1—these should be weighted by each country’s relevant population.

4. Tables should be clarified – it seems like one column has the fixed effects, and the other has the random effects (for table 4)? You might just want to present overall ORs and then the parameter estimates for the random effects. Table 5 is unclear. I cannot tell why there are two different variances? Consider referring to other published articles for other ideas on how to most clearly present results from multilevel models. E.g.,


   http://www.equityhealthj.com/content/13/1/95

5. Discussion should assess meaningfulness of significant associations that seem rather weak (e.g., OR of 0.98), especially since study is over-powered. This is relevant particularly for the country-level effects.

Minor compulsory revisions
1. Methods section, line 101-102 – does permanent residents refer to residents of the household? If so, clarify.

2. In the Methods section, line 108 – clarify DHS definition of diarrheal depositions – was it just “high frequency and low consistency” or was there a more specific definition (e.g., “3+ depositions per day, of looser than normal consistency”)?

3. In the Methods section, line 174, it is unclear which pregnancy is being referred to. Is the analysis with “index” children only, or with all children in the household? Which of the pregnancies was unplanned?

4. Overall, please clarify if all children were used or only one index child per household. If multiple children per household, then this should also be included in the analysis (random effect for household given correlations).

5. Consider shortening Discussion section. I think it can be condensed so that it does not repeat results so much.

6. Could probably shorten discussion of prevalence of ADD – other studies are not fully comparable since they have addressed a totally different population (different countries).

Discretionary revisions
1. Consider using the abbreviation of “AGE” (acute gastroenteritis) instead of ADD (acute diarrheal disease) throughout, as this is an abbreviation I have seen more commonly.

2. How is a family that is nuclear + grandparents (or other relatives) coded?

3. Is wealth index relative to one’s own country? I would imagine so.

4. How was the model’s validity assessed (line 133)?

5. For the models used, it may be helpful to the reader to show the form of the model (formula / equation).

6. Tables 1 and 2 can be combined.

7. Wealth index should be better contextualized (range).

Minor Issues not for Publication
1. In the Methods section, line 89, correct country “Albany” to Albania

2. Line 179 in Methods – false cognate - change “stretch” to “narrow.”

3. Overall, you will want to do another read-through for minor typos and grammatical errors.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests