Author’s response to reviews

Title: Health, poverty and cognitive function in pre-school children: a cohort study in a middle income urban context

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Author’s response to reviews: see over
Dear Dr. Qazi

Please find attached our response to reviewers comments:

Reviewer's report
Title: Health, poverty and cognitive function in pre-school children: a cohort study in a middle income urban context
Version: 3 Date: 2 August 2007
Reviewer: Margaret Caughy

Reviewer's report:

INTRODUCTION
1. At my request, the authors have expanded the introduction, and those additions are welcome. However, there are several places where the terminology used is confusing and/or fuller explication is needed. For example, in the first sentence, the authors state that “cognitive development involves flexibility of thinking for social interactions”. I honestly have no idea what this sentence means. Furthermore, I don’t think this sentence accurately reflects the findings of the cited paper (Landry et al., 2000). Being familiar with the Landry paper, it seems an odd choice for citation given the purpose of the paper under review. The Landry paper is focused on a specific aspect of parenting behavior (broadly referred to as “autonomy support”) and how those behaviors are related to a specific aspect of child functioning (e.g., independence of functioning in cognitive and social domains). This appears tangentially related, at best, to the main goals of the paper under review. My understanding of the purpose of the paper is that it is to examine the relative contributions of both proximal and distal risk factors on child cognitive development, not to examine a very specific parenting behavior such as autonomy support.

Answer: We have taken your point and done a more extensive literature review addressing how poverty affects cognitive score through environmental and children’s health influences.

2. I would also like to see some expansion of the paragraph that begins at the bottom of page 4. The authors refer to the highlighted role of malnutrition and Giardia infection on cognitive development. Although the association between malnutrition and compromised cognitive development is straightforward, further explication should be provided regarding the mechanism linking Giardia infection and poor cognitive development. By what process, specifically, is this specific type of infection associated with cognitive development? Is it mediated
through physiological impacts of malnutrition, or are the authors suggesting a separate mechanism?

**Answer:** We think that this question has been addressed with the rewriting of the introduction, where we make it clear the role of malnutrition and Giardia infection on cognitive development as found by work carried out in Peru by; Berkman DS, Lescano AG, Gilman RH, Lopez SL, Black MM: *Effects of stunting, diarrhoeal disease, and parasitic infection during infancy on cognition in late childhood: a follow-up study*. *Lancet* 2002, 359:564-571.

2. **A** What is the rationale for referring to Giardia specifically in the introduction while the measures of infection include others infectious agents in addition to Giardia?

**Answer** Explained above

3. In the second sentence of this paragraph, the authors appear to be suggesting that the validity of conclusions drawn by Grantham-McGregor (2002) should be questioned because s/he did not control for confounding effects of psychosocial stimulation in the home. If this is indeed what the authors are suggesting, they need to be explicit regarding these perceived limitations of the extant literature in the introduction. They touch upon this in the final sentence of this paragraph, but again, they need to explicit about the hypothesized associations – is it confounding? Mediation? Or a combination thereof?

**Answer:** This is now addressed in the rewritten introduction where we made clear the conclusions reached by Berkman and colleagues towards the effect of nutrition and infection on cognitive functioning, where not controlled for adverse environmental factors associated with both IQ and growth retardation, such as stimulation at home. This point was made by Grantham-McGregor S: *Linear growth retardation and cognition*. *Lancet* 2002, 359: 542-542

3.b. Psychosocial stimulation is remarkably absent from cognitive studies and the work of Grantham-McGregor points this out. We hypothesized that psychosocial stimulation was a mediator for socioeconomic condition with a direct effect on cognitive score.

4. Also, the final sentence of that paragraph beginning at the bottom of p. 4 and ending on p. 5 continues to imply that the psychosocial environment of the home mediates the impact of child health on cognitive development. As laid out in my previous review, it would be very difficult to argue that such is the case. One would have to support a causal pathway from child health to the psychosocial environment. However, the figure conveys the opposite – that child health mediates the effect of psychosocial environment on cognitive development. This is also very hard to defend. One would have to argue there is a causal pathway from psychosocial environment to child health. The authors need to very carefully consider the causal pathways being proposed by their conceptual model and their analyses. A useful reference for that would be Aber, J. L., Bennett, N. G., Conley, D. C., & Li, J. (1997). The effects of poverty on child health and development. *Annual Review of Public Health*, 18, 463-483.

**Answer**
We agree with your point that psychosocial environment of the home do not mediate the impact of child health on cognitive development. The figure now demonstrates a relation only for physical environmental and nutrition and infection variables.

METHODS
5. In that vein, I raised a concern in my previous review regarding how the authors operationalized the infection variables. In their response, the authors state that the operational definition was based on what is standard in the epidemiologic literature. This response wholly misses the point. It does not matter how those variables are categorized in the epidemiologic literature, as I would venture to guess that such literature is focused on those factors as indicators of ill health. For the purpose of this paper, the authors must argue convincingly that the cut points employed are important for discriminating impacts on cognitive development. It is not sufficient to rely on the epidemiology literature in this regard for identifying cut points; one must provide a convincing argument that these cut points are related to reliable differences in cognitive functioning. It would be possible to do this with a one-way ANOVA (i.e., WPPSI score x negative/low/moderate/high infection level). Although the authors refer to one-way ANOVAs on p. 11, I could not find reference to the results for the infection variables specifically.

Answer
We defined the cut-off points for the variable for parasitic infections in relation to differences in cognitive score in the following way. After the stool examination infection with one of the following parasites was defined: Ascaris lumbricoides, Trichuris trichiura, hookworm ou Giardia duodenali; Then a four levels score was built according to: no infection; infection with one parasite; infection with two parasites; and infection with 3 parasites. It was clear that presence of at least one parasite was associated with low cognitive score and that the impact increased with number of parasites (Table 1).

6. As a side note, I’m not sure the infection variables are included in the regression models appropriately. If these are categorical variables (i.e., negative, low, moderate, high), then three dummy variables would need to be created and put in the model. However, in the regression results, I see a single coefficient for each infection variable. This implies that each was included as if it were a continuous variable, not categorical. This needs to be remedied.

Answer
The variable was included in the regression model as suggested

7. Another issue related to the infection variables is the rationale for including separate indicators for different types of infection. Why was this deemed to be necessary? Is there something unique that characterizes one or more of the infectious agents that suggests it may be related to cognitive functioning in a way the other infectious agents are not? Otherwise, I can’t see the rationale for including them in the model separately. Why not just create an index of some sort that combines information from all variables into a single measure that captures the construct of “ill health”?

Answer
We predicted that different infection might affect cognitive performance in different ways (anemia, etc).

**WRITING**

8. The paper also needs to be carefully reviewed for spelling, grammar, and style. For example, “enrollment” is misspelled on p. 6, and the first sentence of the last paragraph of that page does not make sense. At the bottom of that page, the word “against” should be replaced with “versus”. On p. 7, they do not need to state which data collections weren’t used (e.g., medical records) as long as it is clear how all biological/physiological data were obtained.

**Answer**
The text was carefully reviewed. The first sentence of the last paragraph of previous page 6 was corrected.

9. The word “data” takes a plural verb (i.e., It’s “the data were” not “the data was”). The authors need to be consistent in their spelling of “diarrhea”. The CIDI referred to on p. 9 needs to be described fully.

**Answer**
Done

10. The long paragraph describing variable definitions is cumbersome. A table would be more concise.

**Answer**
Done; It is now in figure 3.

11. On p. 12, I believe the authorsmisspelled “carers” as “careers”. However, the former is not a word. A more appropriate choice would be “caregivers”.

**Answer**
Done.

12. Figure 1 is confusing. What does “reached final model” mean?

**Answer**
The variables which remained in the final model because they were significant at 5% level. We use the word remained now.

13. Why is A lumbricoids specified in the model?

**Answer**
It is not there anymore because we have built an index with all the parasites

14. Why do the authors think birth order is an important factor? I’m wondering if they would be more appropriately focused on siblings vs. no siblings.

**Answer**
In large families of very limited resources as those included in our study cognitive performance could be influenced by birth order

15. It appears that some parts of Table 3 are in Portuguese.

**Answer**
Done