**Author’s response to reviews**

**Title:** Addressing malnutrition among children in routine care: How is the Integrated Management of Childhood Illnesses strategy implemented at health centre level in Burundi?

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**Version:** 3 **Date:** 12 February 2019

**Author’s response to reviews:**

January 31st, 2019
Dear Editor:

We are pleased to resubmit the revised version of "Addressing malnutrition among children in routine care: How is the Integrated Management of Childhood Illnesses strategy implemented at health centre level in Burundi? (NUTN-D-18-00138R3). Thank you for the revision invitation and positive evaluations for our manuscript. We really appreciated constructive comments of Editor and reviewers.

We have carefully reviewed the comments and have revised the manuscript accordingly.

Our responses are given in a point-by-point manner below and indicated in the text as well as other changes to the manuscript by using track changes as requested.

We hope the revised version is now suitable for publication and look forward to hearing from you in due course.

Sincerely,

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Editor Comments:

Your manuscript "Addressing malnutrition among children in routine care: How is the Integrated Management of Childhood Illnesses strategy implemented at health centre level in Burundi?" (NUTN-D-18-00138R3) has been assessed by our reviewers. They have raised a number of points which we believe would improve the manuscript and may allow a revised version to be published in BMC Nutrition.

Response:

Thank you for your revision invitation. We have carefully reviewed the comments and our responses are given in a point-by-point manner below.

Response to Reviewer 3 (Harold Alderman):

Thank you for your review of our paper. We have answered each of your points, as developed below.

1. There is a Society for Implementation Science in Nutrition. The results here seem to be the type of work that the society calls for. It is very practical; it points to steps that can lead to improved implementation such as better contracting and in-service training (although this can be developed in more detail). As mentioned below, the results may be biased towards better performance; there is little that the research teams can do about this but when the limitations are mentioned the authors might indicate the direction of this bias more explicitly.

Response:

Thank you for your observation. We have added some extra information on this possible bias in the section presenting the limits of the study.
2. Line 95 claims that there are few studies on the topic but references of a number of studies [20-23] that are deemed to be similar are cited. It would be of interest to include a brief discussion of what the current studies adds to the body of evidence. Is it merely a replication? Or does it provide additional insights?

Response:

Thank you for your helpful comment. We added in the discussion part:

“The recent Cochrane systematic review evaluated the effects IMCI strategy implementation in terms of death, nutritional status and quality of care. However, the certainty of the evidence has been assessed as too low to allow an affirmative conclusion on whether or not IMCI has an effect on the way of HWs treat common illnesses. Our results are consistent with those of two studies focused on febrile children in Ghana and Zambia. In these two middle-income countries, the studies by Baiden et al. and Lunze et al. respectively also highlighted that adherence to IMCI case management guidelines were rather poor and below expectations. Our study complements their works by showing that the problem also arises for malnutrition, which is very rarely the presenting complaint in curative consultation”. (line350-358)

3. The authors are a bit imprecise regarding the Hawthorne effect. While it is the case that the study has to consider the possible effects on behavior from the fact that the service providers are being observed, this is a particular risk that is somewhat different than the global effect for this term is applied. The effect is named for factory workers who performed better regarding of what treatment they received not because they were trying to influence the results in a certain direction (as potentially with the service providers here) but because they were pleased to be recognized. This is a minor point but maybe you can get by discussing potential bias without mentioned Hawthorne.

Response:

Thank you for your suggestion. We have clarified now in which sense the phenomenon would have played on health workers. Therefore, we revised the paragraph in limitation part as follow:

“First, the mere fact of being research subjects and the attention from the surveyors may have temporarily altered the behavior of the observed HWs. This could have changed their usual practices in curative consultation by trying to prove that they are doing their job properly.
If this effect has played any role, our results actually underestimate the depth of the problem”. (Lines 364-369)

4. Still, I fail to see why explaining the object of the study [line 151] would minimize the risk. Indeed, it might magnify the risk, as the HW would be primed [reminded] to consider applying the list and be more mindful even if they were not trying to manipulate the results. There is a large literature in psychology regarding the ease by which behavior is modified by such priming.

Response:

Indeed. Thank you for your helpful comment. Our answers to your question are:

This information was prompted by the need to prevent two possible misunderstandings. Firstly, it was a way of reassuring that the results of the survey would not negatively affect their employment as health workers of the HC. Secondly, in Burundi, health workers are used to evaluations under the performance-based financing scheme. Such evaluations have incidence on the income earned by the HC.

We have added this information as:

“HWs were also informed that the survey was independent from the qualitative assessments quarterly done under the PBF scheme: the evaluation would neither affect their employment as a nurse in the HC nor their income ”. (line 156-158)

5. Regarding the results in table 6 [discussed around line 239]: why were some HWs responsible for management of acute malnutrition and not all? This already implies a departure from a strict IMCI protocol (in the sense that there is an apparent specialization or at least prioritization). It is not surprising that individuals who have this as an explicit responsibility would undertake this task more often. The contextual results seem to imply that staff adapt their use of IMCI to the circumstances.

Response:

Thank you for your comment. Sorry for the misunderstanding.

Nurses take turns for Curative consultations. Screening for malnutrition should indeed be maximum in curative consultation of children as well as in the preventive activities (vaccination
and growth monitoring). In curative consultation, the IMCI should be helpful to avoid some missed detection of malnutrition cases.

After the screened children have been enrolled in acute malnutrition treatment services, outpatient follow-up - every two weeks - is done specifically by a nurse assigned to these services according to the distribution of tasks at the level of the HC (maternity, vaccination, family planning ...). It is these people then who seem to be doing better in CC. C. IMCI is an important tool in a context of low capacities of providers in the detection and management of malnutrition. We have specified the extent of this responsibility by rephrasing and adding in discussion part:

“These results suggest that a poorly implemented split of tasks is not conducive to malnutrition screening. Some rotation of staff within the different departments of the HC would probably increase staff versatility and hopefully, lead to a higher attention to malnutrition in routine consultation“.(line 333-337)

6. But this also brings up the possibility that other workers do not focus on acute malnutrition because the population they serve is at lower risk. More general, while you cannot undertake a causal analysis, it would be of interest to see how the stunting / SAM rates differ by performance of HWs. High malnutrition rates with poor IMCI performance might - but only might - reflect neglect on the part of HW staff. Conversely, low rates in the context of what is deemed poor performance might reflect a different path: staff do not take the time to focus on SAM because it is relatively rare in their experience. As mentioned, the study cannot be definitive on this, but some exploration might be illustrative.

Response:

Thank you for your comment.

First, as mentioned above, Nurses take turns for Curative consultations and therefore serve the population with a same risk.

Second, In Methods part, we mentioned that with this paper, our aim was to evaluate HWs practices regarding the assessment of the nutritional status of the child, the history taking and examination skills and subsequent actions taken, including counseling

In another forthcoming paper, we have documented the MAM and SAM cases diagnosed by observed HWs in curative consultations and those diagnosed by surveyors in exit interviews (research instrument not used with this paper). Then, due to the low rates in curative consultation compared to those of exit interviews, we did not any kind of classification by HWs
Other [minor] points:

1. why report global acute malnutrition when elsewhere SAM and MAM are reported? GAM adds little over the other two somewhat more precise categories.

Response:
Thank you.
Revised as suggested: line 113-114 & 121-122

2. Line 140/1: 'for instance' not needed in the clause that begins with 'such as'.

Response:
Thank you
We removed it.(line 144)

3. Line 253. I'd like to have this contract explained a bit more. This and in-service training seem to be entry points for improved implementation but I could not find a description of the terms of the contracts in the paper.

Response:
Thank you
By contract with the government, we mean that they have a permanent contract with benefits such as the right to a pension. The contract with the HC is for a fixed term and does not generally offer pension
We added “permanent” to specify. (line 321)

4. Line 353: I fail to see what this study has to do with performance based finance. IMCI protocols have little to do with performance based financing and, indeed, the two may have diverging incentives.

Response:
Thank you for your comment. We have added some extra information on this possible link in Burundi in conclusion:

“The observed low compliance to IMCI shows that a serious general problem with quality of care persists, despite attention put upon quality through PBF quality checklists. Possible actions include a revision of how quality of care is measured under the national PBF program (see for example, Fritsche & Peabody 2018) and the embedment of PBF into a more comprehensive approach to the determinants of quality of care” (line 387-391)

5. Line 392: While the World Bank may have funded an impact evaluation the current paper is not an impact evaluation. Alternative working might be sought here.
Response:
Thank you
We have revised accordingly.

6. Finally, while I do not expect a direct application of the techniques that Jishnu Das and Jeff Hammer used to study physicians' behavior, the authors might find their articles of interest.
Response:

Thank you for your suggestion. We are familiar with their work (and other studies done by Kenneth Leonard).