Author’s response to reviews

Title: Development and acceptability testing of ready-to-use supplementary food made from locally available food ingredients in Bangladesh

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Author’s response to reviews: see over
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Editor
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Dear Editor,

Thank you very much for sending the reviewers’ comments on our manuscript “Development and acceptability testing of ready-to-use supplementary food made from locally available food ingredients in Bangladesh” (MS: 1739329552119683). We take this opportunity to thank the reviewers for their time and interest and sincere suggestions to improve the paper.

The reviewers have suggested including additional details on methods and the result/discussion sections and addition of specific references on RUSF related work in Africa. We have revised the manuscript accordingly for your review and consideration for publication in BMC Pediatrics. I am enclosing with this letter the revised manuscript as well as the detailed response to the review comments.

Yours sincerely,

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Title: Development and acceptability testing of ready-to-use supplementary food made from locally available food ingredients in Bangladesh

Reviewer: Frank Wieringa

MAJOR COMPULSORY REVISIONS:
1. In the methods section, the actual intervention is hard to follow. If I understand correctly, infants were fed the food (based on the randomization) on day 1. Went home with a portion for 2 days (or longer?? why did health workers return?). And then came back at the end of the week, for testing again. The paper reports data only from this last day....??? Please re-write the method section to make this more clear.

Response: Sentences in the methods section have been re-phrased.

The feeding on first day was held at the nutrition centre in Baoniabad slum of Mirpur, Dhaka. The first day feeding session enabled study staff to get familiarized with the mothers and children and also for the latter to be habituated to the food. After the first day feeding session all participants were supplied with the respective food supplement for two days to use under real life conditions with a daily dose of 50g. Before end of first two days supplementation, our field worker visited the households and continued her visit in the households every alternate day to give the supplements and recorded morbidity, if there was any. At the end of one week period, field workers requested the participants to come again to the nutrition centre and the feeding was observed for the second time. Data on this second day at the end of the one week period was included in the analysis.

2. Another concern, which cannot be corrected now, is the study design. If the authors tested indeed the acceptability of the 3 different food products on only 1 day, I am a bit puzzled on why the authors didn't test the 3 food products in all 90 children, instead of dividing the children in 3 groups, each group only receiving 1 food product. Power of the study would have increased considerably by testing all food products in all children.

Response: We agree with the reviewer’s comment, and admit that this is a limitation of our study.

MINOR ESSENTIAL REVISIONS
1. Abstract: The literature on acute malnutrition is being swamped with abbreviations nowadays. Please define RUCFS a bit better in the abstract, as it might be unclear what the difference is with a conventional RUSF.

Response: We thank the reviewer for the very practical suggestion, and we have renamed the food as RUSF as per the reviewer’s comments.

2. Abstract - methods. You can delete '(1= dislike...)' as you do not report the scores in the result section.

Response: The following sentence has been included in the result section of the abstract:
Using the Hedonic Scale the two RUSF were more liked by mothers compared to Pushti packet.
3. Background.
I find the sentence 'but more nutritious a supplementary food for young children in Bangladesh, particularly those from food insecure households' confusing. The nutritional value of a product is not dependent on the subject consuming it.
Please re-write

Response: ‘Food insecure households’ is deleted from the above sentence.

4. Page 7. I am a bit surprised by the high energy density if the intended serving size was 50 g, also given the fact that the RUCSF is supposedly added to a porridge which also provides additional energy. 'The energy density of RUCSF was targeted at 250 kcal/50g (per serving).'
Can the authors explain why they wanted to provide so much extra energy, as this would more be a therapeutic food product rather than a supplementary food product. Given the fact that the children ate on average 28 g, wouldn't a serving size of 25 g have been more realistic for the development? And then the higher energy content is also more justified.

Response: We have now renamed the food as RUSF as per the reviewer’s suggestion. Although RUSF, in contrast to a complementary food, does not require strict adherence to energy levels, we have offered 50g to be comparable to the Pushti packet. Fifty gram of RUSF provides 250 kcal. However, in the ongoing efficacy trial of the same food, we are providing 125 kcal of RUSF for infants 6-11 months old and 250 kcal for older children. Accordingly, we have modified the introduction section.

5. Results.
Please delete the first paragraph, or move it to 'methods. Start results with 'A total of... '
[To combat micronutrient deficiencies and high burden of moderate malnutrition among children especially from food insecure households, two varieties of ready-to-use complementary food supplements (RUCFS) were developed – one was rice and lentil based and the other was chickpea based. Preparation of RUCFS undergoes different steps i.e. roasting, particle size reduction, homogeneous blending and packaging (figure 2). Dried skimmed milk powder, sugar, soybean oil and vitamin mineral premix were the common ingredients for both RUCFS. The total energy content of 50g of rice-lentil and of chickpea-based RUCFS was 264 kcal and 267 kcal respectively. Protein-energy ratio (PER) for rice-lentil and chickpea recipes were 7.7 and 9.0 percent respectively, whereas fat-energy ratio (FER) for the two recipes were 50.5 percent and 53.6 percent respectively. These RUCFS had greater energy density than Pushti packet (energy 188 kcal per 50g, PER 10.4 percent, and FER 20.1 percent).]

Response: Our study has two parts: development of recipes and acceptability testing. We prefer to keep the content regarding RUSF development as part of the result section.

6. Discussion: Page 15 'Children consumed an average of 47.1-56.7 percent of the RUCFS offered and 34.4 percent of Pushti packet offered.' This is less than assumed for the power calculation. Please comment on this.
Response: We agree that consumption of three diets was low than the assumed 60%, highest for chickpea based RUSF (57%) and lowest for Pushti packet (34.4%). Contrary to our assumption, the results we observed reflect what was observed in the trial. Perhaps this can change in a larger trial or in real life.

7. General point.
The food products all scored very high on the hedonic scale (above 6 points, out of 7), with overall liking for the 2 new products even being 6.9 points. It feels a bit as though the caretakers have given 'expected answers' rather than real opinions. Perhaps the authors can comment on this in the discussion.

Response: We do not have any evidence or observation that suggests that caretakers have given expected answers instead of real opinions. The Hedonic Scale scoring was not our primary outcome and that is why we also used velocity of food intake.
Title: Development and acceptability testing of ready-to-use supplementary food made from locally available food ingredients in Bangladesh

Reviewer: Paluku Bahwere

GENERAL COMMENT
This is an important work contributing to the effort to tackle chronic undernutrition by improving complementary feeding. The question is well defined and the methods appropriate and well described. However, at this stage it is difficult to confirm that based on the criteria used, the data back the main conclusion as the difference reported may just reflect a difference in volume offered and not taste preference.

MAJOR COMPULSORY REVISIONS

1. It is stated in the methods section that “The amount of water added to the Pushti packet was noted and subtracted during analysis”. This means that for the comparison of intake, only the amount of dry-matter used to prepare the porridge is considered. We believe that this introduce a confounding factor. Indeed, authors mention this in the discussion by stating that “adding water to Pushti packet increases the volume of food”. Thus, the difference in dry-matter consumed may not be confidently be attributed to difference in taste preference if the absolute volume of food consumed is not significantly different. The gastric capacity is a potential confounding factor. Thus, We suggest that authors add data showing the comparison of the 3 foods with the volume of Pusthi being the total of both dry-matter and water.

Response: We agree with the reviewer’s comments. Pushti packet is usually consumed by adding water so that it becomes a thick gruel and does not have the risk of choking. As per the reviewer’s suggestion, we have decided to consider the real life situation (i.e. adding water to the contents of the Pushti packet when feeding the children) when comparing with RUSF. The analysis has been revised accordingly.

2. There is a comparison of 3 groups but it is not mentioned if the p-value is corrected for multiple comparisons. We believe that Bonferonni correction for multiple comparisons needs to be applied.

Response: Post Hoc Bonferonni test was applied for multiple comparisons. It is now mentioned in method section.

3. Authors should clarify the assumptions used for sample size calculation and eventually provide the formula and the reference. Reference 7 provided is not suitable for that purpose as it is not a reference on statistical methods for calculating sample size. In addition, authors should confirm that the calculated sample was giving enough power for the comparison of likert scale data and was adjusted for multiple comparisons.

Response: The sample size was estimated in consideration of the primary outcome variable, i.e percent amount of food consumed. The Hedonic Scale based liking and disliking was not our
main objective. Accordingly, we used the method for estimating sample size that was used by Adu-Afarwuah 2011, and Phuka 2011. Reference # 7 (Adu-Afarwuah 2011) is deleted from methods section.

MINOR ESSENTIAL REVISIONS

4. The content regarding RUCFS development need to be reorganized. There are phrases that should be in the results section included in the methods section. As an example, I think that the phrase below should move to the results section
“Rice, lentil and chickpea were chosen as they are widely grown and consumed in Bangladesh and other South Asian countries”.

Response: We agree with the reviewer’s comments. The above sentence has been moved to the result section.

5. The sub-heading “RUCFS production” should be moved up and placed before the phrase below: “Potential recipes were produced in small batches by mixing all ingredients in an electric blender”.

Response: It has been revised as per reviewer’s comments

6. It is mentioned in the sample size calculation that the criterion for acceptability was eating at least 40% of the serving. We recommend that this is stated also when the amount of food eaten criterion is defined. Also, it will be interesting to add the rationale that lead to the choice of the criteria.

Response: In similar studies done by Adu-Afarwuah et al (2011) and Phuka et al (2011) the criteria for acceptability was 50%. Anecdotal observations in Bangladesh suggest that for Pushti packet, children could consume about 40% of what was offered. This was due to the fact that mothers mixed the food with water to make it into a thick gruel. We, therefore, selected 40% intake as the criteria for acceptability.

7. Mothers were trained on facial actions scoring systems to assess the acceptability using facial mimics. We expected the results of that component to be also presented. Can authors add and comment these results?

Response: Mothers were not trained on facial actions, rather the Research Assistants were trained to observe feeding sessions. Facial actions were assessed to make sure that feeding was not forceful.

8. We assume that the decision to include 70% of the daily requirement in key micronutrients is based on the assumption of home food plus breastfeeding covering 30% of the requirements. If so, can this be stated in the methods section and the reference provided or authors should mentioned that this was based on research team expert opinion. In addition, the fact that only 50% of the 50g providing the 70% of daily requirement was consumed should be discussed and
future directions regarding optimal fortification of the product and frequency of daily administration of the supplements.

**Response:** Although RUSF in contrast to a complementary food, does not require strict adherence to energy levels, we have offered 50g to be comparable to the Pushti packet. Fifty gram of RUSF provides 250 kcal. However, in the ongoing efficacy trial of the same food, we are providing 125 kcal of RUSF for infants 6-11 months old and 250 kcal for older children. We have included in method section as follows: ‘70% of micronutrient RDA was added based on expert opinion and consensus within the research team.’

**DISCRETIONARY REVISIONS**

9. We suggest that authors add sub-heading in the results section for the RUCFs development section and the acceptability section.

**Response:** It has been done accordingly.

10. References needed after the listed phrases

a. “Currently there are 1.7 million children under five years of age in the country suffering from wasting or acute malnutrition (<-2 z score weight-for-height)”.

**Response:** NIPORT, Mitra and Associates, Macro International: Bangladesh Demographic and Health Survey 2011. Dhaka, Bangladesh and Calverton, Maryland, USA: NIPORT, Mitra and Associates, Macro International, 2011. This reference has been incorporated.

b. Malnutrition is nearly always accompanied by deficiencies of essential micronutrients, raising the importance of evaluating the impact of micronutrient content of food products in reducing micronutrient deficiencies during 6-12 months of life.


This reference has been incorporated.

c. ...was designed to have the required amount of micronutrients and vitamins essential for growth and development in children 6-24 months of age.

**Response:** The following sentence is added: ‘micronutrient was added based on research team expert opinion’

d. Micronutrient content was set to cover 70 percent of the requirements of children aged 6-18 months.

**Response:** The following sentence is added: ‘micronutrient was added based on expert opinion and consensus within the research team’
11. Check if reference 7 is appropriately cited after the phrase “Although effective counseling to improve the quality of complementary feeding works in food secure communities, 6 supplementation with nutritious food may be imperative for children of food insecure households, and those that cannot afford an adequately diverse diet [5-7]”.

Response: Reference #7 (Adu-Afarwuah et al 2011) has been deleted from the above sentence.

12. What means acceptability in the phrase “A final selection was made based on the nutritive value, local availability, acceptability, cost and sustainability of the local ingredients”? Is the same meaning as acceptability in the title of the paper? Is it cultural acceptability? To avoid confusion, can the authors use an alternative word if the word has a different meaning?

Response: We have deleted the word ‘acceptability’ in writing ‘…a final selection of ingredients…’.

13. What is the difference between” local availability” and “sustainability of the local ingredient”

Response: We have deleted the word sustainability.

14. We suggest to clarify the message in the phrase “The primary outcome variable for the acceptability trial was to see the acceptability of RUCFS or Pushti packet by measuring the amount of food consumed by children within a specific time”

Response: It has been rephrased

15. The message in this phrase is a bit confusing. “This is the first study presenting acceptability data on locally produced RUCFS for children, which is a novel way to ensure nutritional adequacy of children’s diet particularly for food insecure households and is nutritionally more complete than Pushti packet “

Response: We have rephrased the above sentence.

16. “This is the first study presenting acceptability data on locally produced RUCFS for children”. At least two papers have reported acceptability of products similar to RUCFS in African context (Bisimwa et al, 2012; Phuka et al, 2011). May be the authors should add in Asia context.

Response: We agree with reviewer’s comments. Two of these papers are now included.