Author's response to reviews

Title: Use of commercial infant cereals as complementary food in infants and young children in Ghana

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Version: 1 Date: 06 Jul 2017

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Response to reviewer comments - NUTN-D-17-00064

Reviewer 1.

This study generally explores, in a cross sectional design, the use of commercial infant cereals (CIC) and its contribution to micronutrient adequacy of infants and young children. However, it seems there are major conceptual and methodological issues that prevent this reviewer to accept the conclusion the authors made. Authors do well in considering the following comments/questions to put the manuscript in proper context (some may overlap, order doesn't show importance):

1. To start with, commercial food products are not the preferred way of promoting good nutrition in infants and young children (IYC), unless in some very difficult circumstances. Authors seems to argue that use of commercial products are common strategies to complement the diets of IYC and use older references (in the 1990s and 2000s) to support their argument. This is problematic because recent WHO guidelines/indicators for infant and young child feeding practices suggest age appropriate meal frequency with minimum dietary diversity as way of ensuring nutrient adequacy in these groups. The paper fails to provide any practical evidence on such in the context the study occurred.

Authors’ response:

Authors agree with reviewer on WHO indicators for infant and young child feeding and have revised the background to reflect the need for IYC to meet these recommendations for adequate nutrition and have provided recent references. An excerpt from the background to this effect now
reads “To ensure adequate nutrition in these children, the World Health Organization recommends age appropriate complementary feeding of both frequency and diversity [6, 13]. It is recommended that IYC consume from at least four out of seven food groups in a day to ensure adequate nutrient intake [13]. Dietary diversity is shown to be associated with adequate micronutrient intake in different developing country settings including in Philippines [14] and Madagascar [15]” (see background section; page 4, lines 22-23 through page 5, lines 1-4).

2. How is it that the authors conclude CIC significantly contributes to micronutrient adequacy of infant and young children without proper control diet/group?

Authors’ response:

Authors aimed to determine whether IYC consuming CIC were able to meet their needs of some nutrients. The conclusions made were not relative to those who were not consuming CIC. As children who are fed CIC may be entirely reliant on it, especially those 6 – 12 months as our data show, it was important to determine whether the CIC consumed at least was adequate. The idea was not to compare CIC consumers to non-consumers, in which case authors would have been interested in the degree of adequacy among CIC consumers and non-consumers and determine whether differences were significant. However, following subsequent comments of this reviewer, authors have not included probability of adequacies in the revised manuscript.

3. Do the CIC meet the Codex Alimentarius Standard for infant foods?

Authors’ response:

Infant foods sold on the Ghanaian market must be approved by the Ghana Standards Authority and the Ghana Foods and Drugs Authority and these bodies ensure that these products meet all existing and applicable standards and must bear special registration numbers before they are exposed to the public. CIC consumed by IYC in this study were registered with these bodies and bore standard registration numbers.

4. Authors depended on the nutrition information provided by the product manufacturers without making sample lab analysis of their own, instead they assumed the products contained the claimed nutrients and that the children also consumed all the reported amounts without (which may be unlikely). This doesn't support the conclusion of the paper.

Authors’ response:

Authors agree with reviewer on the concern about sample lab analysis, but in the absence of that, there is some level of confidence in the use of manufacturer nutrient information provided by references authors have used in discussing this assumption as a limitation (see discussion section; page 18, lines17 – 23 through page 19, line 1).

Authors have also discussed leftovers as a limitation to the study. However one must keep in mind the setting of this study; a developing country where mothers may not be very financially sound and CIC is acquired at a cost. It is unlikely that mothers would prepare some number of
tablespoons of CIC for a child and the child is unable to finish it and mothers keep giving higher quantities just to wash leftovers away. Authors’ experience with child feeding and given this context, we believe that over time, caregivers are able to serve quantities that do not always lead to leftovers that could have significantly affected our calculations of nutrient intake.

5. As stated above, if the intent of the paper was to explore contributions of CIC to micronutrient adequacy, proper control group (that depend on just the regular diet) should have been in place. It is problematic to make such a claim of benefit with just a cross-section study. What if children with regular diets were better in terms of their nutrient intakes? What if the use of CIC was discouraging caregivers from providing other nutritious foods to IYC because of the false sense of assurance that CIC superior and sufficient?

Authors’ response:

Authors have earlier responded to comment 2 on control group and why this was not included in the study. Authors have addressed the comment on CIC use having a tendency to discourage caregivers from providing other nutritious foods to IYC because of the false sense of assurance that CIC is superior and sufficient. The revised manuscript have identified younger children (6 – 12 months) who had higher daily frequency of CIC hence being less likely to have other feeding moments for other family foods. Mothers also believed that CIC alone was nutritionally adequate and promoted health and growth of their children. This notion obviously may make mothers reluctant in giving or enriching family foods for IYC. The manuscript has been revised to address this comment. See discussion section; page 14, lines 21 – 23, through page 15, lines 1 – 5.

6. Let one assume that the study had a proper control group and caregivers accurately recalled amount consumed: How is that the prevalence of [risk of] inadequacy [or the associated probability of adequacy] for a given nutrient calculated just from a one day recall CIC consumption by the IYC, even assuming CIC was all that was consumed? This not correct. It's likely that children had eaten other foods and/or breastfed. Your results as presented do not show these distinctions. Probability of adequacy should be calculated on usual intake (intakes that represent all days of the week), including the contribution of other foods/breast milk, which you don't seem to have.

Authors’ response:

Authors agree with reviewer on the conditions for probability of adequacy to be calculated and have not included this in the revised manuscript. A reference specifying the reason for not calculating probability of adequacy for children has been included in the methods section; page 9, lines 5 – 6. Following this revision, Table 6 which contained information on probability of adequacies has been removed, the discussion section has also been revised accordingly. Authors now present only the calculated micronutrients from CIC consumption. Authors have included Calcium intake from CIC in the revised manuscript, Calcium was not included earlier because an estimated average requirement (EAR) for Calcium has not been set for children 6-23 months and this value was needed to calculate probability of adequacy (PA). Since the revised manuscript
does not include PAs. Authors saw that it was important to report on it. Table 5 has been modified to present the micronutrients consumed from CIC.

7. Authors did comparison of intakes of nutrients between older age groups and younger ones which didn't make sense to me. Obviously older children are expected to have higher intake (CIC plus other foods). I don't see the rationale of doing such comparison;

Authors’ response:

The revised manuscript does not include a comparison of intakes of nutrients between age groups. Table 5 no longer contain the p-values from the t-test and the methods subsection on data analysis has been revised to reflect this change.

8. A realistic story this cross-sectional study can tell is really:

a. to assess the prevalence of CIC use among caregivers in a given location and season;

b. to assess why caregivers opt CIC instead of enriching regular local foods (eg. why not improve diet diversity and meal frequency, consistency, etc.)

c. explore whether the use of CIC is displacing regular family foods, giving a notions to caregivers' that the CIC is meeting the children's nutrition requirements;

d. which demography is likely to depend on CIC and why--what might be the driving factor?

e. what is the cost of CIC as opposed to other local IYC foods?

Authors’ response:

The manuscript has generally been revised to address these comments. ‘a’: authors have mentioned that CIC use is high among caregivers in the study location and sample; see conclusion section: page 19, lines 10 – 12.

‘b and c’: these were presented previously and have been discussed in detail in the revised manuscript; discussion section: page 13, lines 16 – 21 now reads: “Mothers in this study believed that the use of CIC was good for child growth and development and was enough to meet the nutritional needs of their IYC. This is probably the reason for the high demand of CIC by mothers. With this notion that CIC could meet the nutritional needs of their children and promote growth, mothers may not see the need to include locally available and nutrient dense complementary foods which would improve dietary diversity and meet nutritional needs”.

‘d’: the revised manuscript has identified younger aged children 6 – 12 months to be dependent on CIC as they had a higher frequency of consumption of CIC in a day implying fewer to no opportunity to offer other family foods apart from breastmilk.
‘e’: CIC sold on the Ghanaian market are relatively expensive. Most locally available complementary foods are not packaged and sold, they are mostly a modification of family diet, the most popular local complementary food is ‘koko’ made from fermented corn dough which is relatively cheaper to obtain.

9. Adjust your paper considering these comments and focus your discussions accordingly--your discussions can be a lot shorter and more focused.

Authors’ response:

Authors have adjusted the paper considering the comments and have focused the discussions accordingly, the discussions are now shorter. We have also modified the title of the paper to reflect the revisions and the conclusions arrived at in the revised manuscript.

Reviewer 2

In this study authors have examined the potential contribution of fortified commercial infant cereals (CIC) to the micronutrient intake of 384 infants and young children aged between 6 months to 23 months (IYC 6-23). They have estimated the usual daily quantities of CIC given to IYC by questionnaires administered to the mothers and calculated the micronutrient intake from CIC and their probabilities of adequacy (PA). They concluded that the use of CIC as complementary food could contribute significantly to the adequacy of iron, zinc, iodine, vitamin A, vitamin C and vitamin B12 among infants and young children.

1. This study is hypothetical assuming that all the nutrient amounts mentioned by the manufacturer are correct, stable and absorbed from the gastrointestinal tract. To make a firm conclusion authors should check the nutritional status of the children. This could be done at least by evaluating growth and development of the children. Authors can compare the health status of children consuming CIC with non-consumers (selected as a control group) and/or they may compare low amount consumers vs. high amount consumers. The best way of finding these complementary foods is working is to measure the levels of the mentioned elements but it may be difficult.

Authors’ response:

Following comments from reviewer 1, authors have responded to the use of manufacturer nutrient information. Authors have also discussed bioavailability of the nutrients, especially iron and zinc. See discussion section page 17; lines 15 – 21. Authors have earlier responded to comment 2 from reviewer 1 on a control group. Further, this study was designed to be a cross sectional one, the inherent limitation in the design did not make it possible to follow children to measure their growth and development.