Reviewer’s report

Title: Current and potential role of grain legumes on protein and micronutrient adequacy of the diet of rural Ghanaian infants and young children: using linear programming

Version: 0 Date: 19 Nov 2018

Reviewer: Zach Conrad

Reviewer’s report:

General comments

The authors describe a study in which they examine the role of legumes in meeting dietary needs. This manuscript is generally well-written and presented in great detail, and the analysis is rigorous. Yet there is so much information and analysis being presented in this paper that sometimes the larger key issues are not well explained - primarily, it's not clear what the central comparisons are. Are the authors comparing between groups, within groups, or between models of the same group? The authors need to be very clear about what the main comparisons are, why they are being compared, and how they are being compared. As it is, these explanations do not come through clearly in the manuscript, and as a reader I found myself losing the central parts of the study while I was sifting through all of the detail. More specific comments can be found below.

(All line numbers reference below refer to the right-most set of line numbers in the manuscript (there are two sets of line numbers in the manuscript)).

Introduction

Well-written and clear. But acronyms appear to be over-used, which reduces readability. Can the authors please be sparing in their use of acronyms? Examples: EAA, LMIC, IYC, FBR.

Can the authors please review the Global Burden of Disease publications to (e.g., Mozaffarian et al.) to see if they have published any studies on legume consumption in Africa?

Since the authors focus specifically on grain legumes, please provide a clear distinction between grain legumes and other types of legumes. Are grains legumes a distinct type of legume? If so, please provide a rationale for why the authors are focusing on this specific type of legume at the expense of all others.

Methods

At the outset of this section (or perhaps the "Subjects" subsection), it would be helpful to briefly mention the different groups. Otherwise, it can be confusing when the authors state, for example,
that there was a breastfeeding group, since this was not mentioned previously as a rationale for the study. Also, it's not clear what is meant on lines 120-121. Briefly mentioning the study groups early on would help to clarify these things.

Lines 120-121: Its quite unclear how the sample size was arrived at. Why didn't the authors use a standard power calculation?

Lines 126-127: This is the first time food prices are mentioned, so it's unclear why the authors are collecting these data. Please clarify in the text why this is an important measure. This will also help to clarify lines 158-159.

Line 142: Were the days randomly selected or evenly distributed over the week? Please clarify in the text.

Lines 146-151: Please clarify in the text. What does it mean that there are duplicate amounts? Amounts of what? Also, please specifically clarify in the text what is meant by lines 148-151 - its not clear what is being done here and why.

Line 156-157: Please clarify why it is needed to convert all of these units. Why do the authors need to convert monetary values to consumption amounts? And what is a weight-to-weight measure? What is a household unit? Please clarify in the text.

Line 167: Since the sample is Ghanaian, why is the Ghana FCT the least preferred in this list?

Line 194: What four groups? The authors still haven't made clear what these groups are.

Figure 1: How is it possible that, in the third group (Eligible for 12-23mo, BF), there were 100 subjects randomly selected by 114 provide 24HR?

Line 200: Why did the authors use only data from the first day of recall? They went through great lengths to collect a 2nd day of recall data from 20% of the subjects and adjusted for the intra-individual variation, which is crucial - so it's unclear why they didn't include the other day of recall. Please clarify.

Results

OK, so we have our four groups here. But it's still not at all clear which groups are being compared. Lines 194-196 state that the comparison is between children who did and did not consume legumes, but that distinction is not made in any of the four groups listed here. Within each of these groups, did some children consume legumes and some did not, so the comparison is within each of these groups? Or is the comparison across each of these groups? Please clarify throughout the text in key places, specifically in the Methods section. The comparison should not be across groups, namely because of different age groups.

Level of interest
Please indicate how interesting you found the manuscript:

An article of importance in its field

**Quality of written English**

Please indicate the quality of language in the manuscript:

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