Author's response to reviews

Title: Food group intake patterns and nutrient intake vary across low-income Hispanic and African American preschool children in Atlanta: A cross sectional study

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

We are grateful to you and the reviewers for reviewing the above manuscript. We are submitting the revised manuscript having addressed the concerns and comments of the reviewers. These findings presented in this manuscript, are important and will be of interest to clinical dietitians, nutrition researchers, general pediatricians and policy makers.

This work is not and will not be submitted to any other journal while being under consideration for publication by your journal. We hope that the findings are of high priority for publication in the Journal.

Our responses to the reviewers are below the questions or comments.

Response to Reviewer 1

1. In the Methods section please provide a rationale for the use of RDA when DRI is the most common criteria used. The Food and Nutrition Board (2006) recently held a workshop regarding this issue (National Research Council. Dietary Reference Intakes Research Synthesis: Workshop Summary. Washington, DC: The National Academies Press, 2006). The DRI for this specific age group should be used to express requirements whenever possible.

Response:

The wording in the methods section and throughout the article has been changed to reflect that only DRIs were used (page 8, line 7-9; page 8, lines 16-19). DRIs are composed of EARs (Estimated Average Requirements), RDAs (Recommended Dietary Allowances), AIs (Adequate Intakes) and UL (Upper Limits). The RDAs reported in this study are those included in the DRIs (Food and Nutrition Board National Research Council, 2006).

2. There was no mention of physical activity during the subject questionnaire process. It would have just required another part for the questionnaire and should have been included in the data acquisition and analysis. This might explain some of the results in regards to macro nutrient intake and obesity between the two ethnic groups.
We have acknowledged this limitation in the discussion (page 17 lines 3-10). This was a secondary data analysis with the data previously collected for the original study focusing on micronutrient intake.

3. Eliminate the entire section regarding sample size. Since the author did not have enough subjects to meet the initial sample size criteria, it is suggested to just state the number of subjects that were recruited and the number that were utilized for analysis. Furthermore, no references as to the formula used for the calculation of sample size were provided. Moreover, it is not appropriate to use zinc intake as the basis for calculating sample size since the magnitude to determine significance may not be the same as that for one of the macro nutrients.

The section was eliminated as recommended in response to your concerns and it was clarified that the study is a secondary data analysis of data previously collected and therefore the sample size calculations were not for the current analysis. This is now clearly explained both in the sampling section (page 5, line 14-16; page 7, line 7) and in the discussion (page 17, line 1).

4. It is suggested to double check with a scientific technical writer, or with the Journal, to determine if the use of “Black” is appropriate in regards to describing this ethnic group. Usually, “Afro-American” is the term used to describe this ethnic group.

Response:

The term "African-American" now substitutes the term "Black" throughout the manuscript and tables.

5. Please provide some evidence as to the accuracy of the three day diet diary as described in the Methods section. Moreover, please explain the make-up of the “care givers”. Typically, biological mothers provide the best dietary recall for their children. There might be some inaccuracies in the data if Nanny’s, baby sitters or step-parents were recording their children’s diets. Please research and provide some reference to vouch for their accuracy if there is a variation on whom is recording the children’s diets. Their accuracy in recording the child diet might be questionable since they are not biological parents and might have less incentive to adhere to the experimental protocol. This might explain the “15 kcal/kg/day” low energy intake reported as part of this range in the Results section.

Response:

The majority (98.1%, n=103) of the caregivers were biological mothers. This is now mentioned in the manuscript (page 6, lines 20-23). The participant with 15.4 kcal/kg/day was eliminated from the analysis as it is an outlier (page 6, line 18). Three day diet diaries
are considered a valid method to estimate dietary intake, and references for this are now provided in the manuscript (page 7, lines 8-10).

6. Page 8: There is no reference as to the energy intake requirements for these children. This is one of the most important nutrients in regards to future obesity. This should be included in the data analysis.

Response:

The DRI for energy requirements (Estimated Energy Requirements) is documented in the manuscript (page 8, lines 7-11). The proportion of children exceeding them is shown in table 1, and a stratified analysis by "high" and "low" total daily caloric intake for which the EER was used as the cut-point is also documented in table 3.

7. On page 9, Please explain why such a large gap in regards to the proportion of obesity between the Hispanic and Black children was not significant. Moreover, please explain the wide range of caloric intake. In this age range having a caloric intake of only 15 kcal/kg/day seems very low. Moreover, energy intake data for the children in both ethnic groups should be compared to that recommended (DRI specific for age group).

The large gap in regards to proportion of obesity between Hispanics and African Americans is not significant due to the small sample size. However, for the sample of children recruited (n=291) the differences between the proportions of obesity among both race/ethnicities was significant (shown in table 1). The proportion of obese children in the sample used for analysis (n=105) are similar to those of the enrolled sample (n=291). (page 9, lines 21-23; page 10, lines 1-3).

The low caloric intake may be related to under-reporting for that particular participant. We have excluded that participant because the data is an outlier (page 6, line 18).

8. Page 12, it is possible that differences in physical activity might explain the results obtained between the non-obese and obese children as described. Reference to the differences in activity levels as related to ethnic group should be provided.

This is true, and the discussion now contains a full paragraph addressing both the limitation of not having measured physical activity, and the known associations to obesity among these racial/ethnic groups (page 17 lines 3-10).

9. Page 13: Some references to appropriate fruit juice consumption should be provided. Please review the manuscripts published by Cole C. (Cole C, Rising R and Lifshitz F. Are there consequences of incomplete carbohydrate absorption from fruit juice consumption in infants? Arch Pediatr Adolesc Med 1999; 153:1098-110.)
These references are included in the discussion (page 14, lines 16 to 22).

10. **Page 14**: References to activity contributing to the cause of obesity in this age group should be provided. Please see manuscript published by Rising et al (Rising, R. Lifshitz F. A lower metabolic rate in infants from obese biological mothers. Nutrition J 2008; 7:15) that discusses infant obesity. There should be some discussion that obese infants might lead to obese preschoolers due to lifestyle, etc.

These references are included in the discussion (page 17, lines 3-10).

11. **Page 15**: Suggest not recommending reducing protein intake if requirements are met. Only suggest a change if protein intakes are excessive. These children are growing and as long as requirements are met, no changes should be recommended.

The recommendation with regard to intake of protein for African-American children have been modified as suggested. The recommendation now is, 'Meat intake should be reduced if the intake of protein is excessive. Replacing some of the animal protein with vegetable protein, which contains other vital nutrients is also recommended’ (page 16 line 9-11).

12. **Page 15**: In the recommendations there was no discussion concerning fast food. It is well known that fast food is a major contributor to childhood obesity. A discussion in this regard, as well as recommendations, should be provided. Suggest reviewing the manuscript (Lee H. The role of local food availability in explaining obesity risk among young school-aged children. Soc Sci Med. 2012 Feb 10. [Epub ahead of print]) This is just one of many manuscripts that have been recently published regarding this topic.

The discussion now contains a paragraph addressing the importance of fast food as a contributor to childhood obesity, especially among minority groups as the evidence shows. The suggested manuscript and others have been cited, and the reduction of fast food is now part of the list of recommendations for both groups (page 16, lines 17-18; page 17, lines 12-18).

13. **Page 1, line 42**: Phone number not written correctly should be “513-636-7805”. **Page 2, line 6**: change “is” to “are”. **Page 2, line 20**: here and throughout the manuscript “calories/kg/d” should be calories (kcal/kg/day). **Page 9, line 6**: “SD” values should be XX.X ± XX.X throughout the manuscript and including all Tables. **Table 1**: Not necessary to provide two levels of significance (p<0.01 and p<0.05), for this type of study, p<0.05 is sufficient. Please rewrite accordingly. **Table 4**: There appears to be an error in the table, the title is “…percentage of children at or above RDA level…” but the table has a line “Below RDA Level”.

The phone number format and the grammar mistake in page 2, line 6 were corrected. All references to calories per kilogram per day are now read as kcal/kg/day throughout the manuscript. All mean values and standard deviations now have the following format: XX.X ± XX.X. Statistical significance throughout the manuscript and tables is just presented as being <0.05, except in table 3, where p values <0.10 are also presented, due to double
stratification (by high or low caloric intake and by race/ethnicity) in a small sample. The title of Table 4 was corrected to say "below RDA level".

Responses to Reviewer 2:

1. It is not clear how the children were selected and whether they are representative for this minority children population in Atlanta. It is also unclear why they were selected from a study which was carried out already; this introduces additional bias. In addition the sample size is really very low for a dietary survey. Why was it not possible to include more children?

Response:

This is a secondary analysis of data collected from a subgroup of 105 low-income minority pre-school children between the ages of 1 and 5 years enrolled in larger study of assessment of micronutrient status (n=291) between February 2006 and July 2007. The sample size was not done for a dietary survey primarily. This has been clearly stated in the methods section and acknowledged as a limitation in the discussion (page 5, line 14-16; page 7, line 7; page 17, line 1).

2. Sample size calculation: calculating a sample size for a clinical study (blood parameters) is not the same as for food/nutrient intake. Please provide a new sample size calculation for food/nutrient intake. You will see that the sample size needed for the objectives of your study will be much larger.

Response:

The other 2 reviewers recommend excluding the sample size calculation because this is secondary analysis of already collected data (see response to reviewer 1 and 3).

3. You did not measure or control for physical activity, education and social influences. So how do you know that your study population is a low-income group?

Response:

We have acknowledged this limitation (lack of data on physical activity) in the discussion (page 17 lines 3-10). There was no data on social influences. However, the children were recruited from clinics that primarily served low income families (see methods section, page During study enrollment, data was collected on: enrollment on WIC status, mother’s education and type of insurance, which were used as surrogate markers for socio-economic status (page 5, lines 21-23).

4. How come there were so many dietary records which were not of sufficient quality to be included in the analysis?

Response:
The response rate for prospectively collected data in which respondents have to voluntarily record and return documents is usually low. This can account for the rate of completing the food records.

5. The authors speak about dietary patterns but they only analyze single foods and nutrients in their paper. Dietary pattern analysis includes for example dietary quality indices or factor or cluster analyses.....Otherwise the authors simply need to speak about food and nutrient intake and not about dietary pattern analysis. It would be more interesting to compare the food and nutrient intake of these minority children with food and nutrient intake of the general preschool population in the U.S, than to compare food and nutrient intake among Hispanic and Black preschool children. Are their dietary habits worse or better than the general US population of preschool children? How do the dietary habits of those minority children compare with adult Black and Hispanic population which are included and oversampled in the NHANES study? The first paragraph of the introduction is irrelevant if no dietary pattern analysis is performed. Moreover appropriate references are lacking.

Response:

Additional references have been included in the first paragraph of the introduction as suggested by the reviewer. We included an explanation in the discussion section as to why we decided to use proportional intake with servings as the measurement unit as our approach. Given the fact that we don't have sufficient power for a cluster or factor analysis, and that there are no dietary scores for this age group, we used this "proportional intake" approach using servings as our analysis unit. This method was supported by the other reviewers. NHANES uses food frequency questionnaires and 24-hour recalls, while our data was collected with 3-day food diaries. We modified the title and manuscript and used the term "food group intake patterns study" rather than "dietary patterns study". This is consistent with other studies that have used servings as their unit of analysis.

6. You have to complete the statistical methods section. You compared the data using t-tests? I cannot image that the food and nutrient intakes were normally distributed. Please use appropriate statistical tests. Mention the statistical program used for analysis.

Response:

The statistical methods section now clearly states the tests that were used. T-Tests and Linear Regressions were used after having tested all the dependent variables for normality. For all food groups studied, the proportional intake (number of servings per day of the given food group over total servings per day) was found to be normally distributed. The statistical program (SAS 9.3) used for analysis is now mentioned in the manuscript. (page 8, lines 11-13; page 9, line 16).

7. How were under reporters characterized? Were they excluded from the study?
Why/why not?

Response:

Very low daily caloric intake (15 kcals/kg/day) was identified for one participant that had three complete food diaries. This participant was categorized as an outlier and was excluded from the analysis, as stated in the manuscript (page 6, lines 18-19).

8. Please calculate food intake in grams per day (instead of assessing number of servings of food groups a day) and use appropriate software to calculate usual daily food and nutrient intakes.

Response:

We consider that by using grams we wouldn't be able assess the food group intake patterns, which is the aim of our study. Grams of different food groups aren't comparable across each other, while servings are. This approach was considered appropriate by the other reviewers, and has been used by other investigators as referenced in the paper (page 14, lines 2-4).

9. There are spelling errors in the manuscript. The manuscript needs to be proofread by an English native speaker.

Response:

The manuscript has been proofread by an English native speaker.

Minor essential comments

10. Abstract
   - Page 2 line 6: change to: Food and Nutrient intake of low income Hispanic and Black preschool children are not well documented.

Response: This has being modified as recommended

11. -Page 2 line 9: change to: explore how macronutrient and micronutrient intake compare to the Recommended Dietary Allowances (RDA)

Response: This has been modified as recommended

12. -Page 2 line 10: mention which dietary software was used

Response: This has been modified as recommended

13. -Page 2 line 15: The mean percentage of intake: energy percentage?? Unclear
Response: The mean percentage of intake per food group refers to the mean proportion of servings of the given food group over total servings per day. This is now clearly stated in the manuscript (page 2, lines 15-17).

14. Introduction

In the second paragraph you state that there are no data on dietary habits of preschool children of the US. Are there no data from NHANES available? With regard to the recommendations, state the recommendations existing in the US for preschool children (micronutrient and macronutrient intake)

Response:

Page 4, lines 13 to 18 state: ‘The food group intake patterns of children aged 1 through 5 (preschool children) have not been extensively evaluated in the United States, while numerous studies have been conducted for school age children and adolescents (2-5). Although recommendations addressing feeding patterns for children aged two years or above exist, there are no specific recommendations regarding food groups for children less than two years of age, with very little guidance available on the introduction of complementary foods (3)’.

15. In the objectives, mention the micronutrients assessed and add rationale for assessing those micronutrients.

Response:

These micronutrients are the micronutrients identified as being a major issue in low income children in the US and globally. This is now stated in the manuscript (page 9, lines 1-3).

http://www.cdc.gov/pednss/

16. Methods

Define clearly target and study population. Explain better the sampling and recruitment of the children. Is the study population representative for Hispanic and Black Children in Atlanta? Why was it not possible to collect at least some general characteristics of the non-participating children?

This is a secondary analysis of data collected from a subgroup of 105 low-income minority pre-school children between the ages of 1 and 5 years enrolled through convenience sampling in larger study of assessment of micronutrient status (n=291) between February 2006 and July 2007. The sample size was not done for a dietary survey primarily (page 5,
Information on the proportions per sex, race/ethnicity, age and weight status of the full sample (i.e. including non-participating children) is now presented in Table 1.

**17. Food records: 3 consecutive or non-consecutive days?**

Response:

Consecutive days. This is now stated in the manuscript (page 6, lines 11-12).

**18. Food records: The instructors were they dieticians? Did the instructors speak the languages of the minority groups? Who did check the diaries and when? How was quality of the food records assessed and which were the criteria for inclusion of exclusion of certain diaries?**

Response:

The instructors were dietitians and were assisted by Spanish language interpreters. The diaries were checked when received by the research dietitian and research coordinator when received. Diaries that were not adequately completed or did not include all 3 days were excluded. Patients with intake considered outliers were excluded (page 6, lines 21-23; page 7, lines 1-2).

**19. Statistical analyses: did you use a method to calculate long-term food/nutrient intake?**

Response:

This is out of the scope of this study.

**20. Stratification: I think the sample size is really too low to stratify also by sex and age.**

Response:

Although a small sample, stratification of the data for analysis did provide relevant information. Another reviewer requested further stratification of data as shown in table 3.

**21. Page 8 line 7: complementary analysis**

Response: This change has been made.

**22. RDA compliance: The recommendations can be put in a table**

Response: The recommendations are now included as a footnote of table 5.

**23. It is not mentioned whether weight and height of the children were measured?**
Response:

These were measured and this is now stated in the manuscript (page 9, lines 11-12).

24. Results

Page 9, line 12-14: isn’t it because of a lack of power that no significant difference was found for the Hispanic children?

Response:

This could be the case, and this is now mentioned in the manuscript (page 10, lines 2-3). The small sample size is acknowledged as one of the limitations of the study in the discussion (page 17, line 1).

25. Discussion

Line 16-17: I would drop everything on vitamin D because intake of foods is not the only source. The major source is sun exposure.

Response:

Although the major source of vitamin D is sun exposure, dietary vitamin D intake is important. The recent IOM supports the need for dietary and supplemental vitamin D, and investigators have reported the importance of dietary vitamin D for this population (Cole CR et al. 25-hydroxyvitamin D status of healthy, low-income, minority children in Atlanta, Georgia. Pediatrics 2010, 125(4):633-639).

Responses to Reviewer 3

1. It would be useful if the authors had some data on the actual socio-economic status of participants, for eg., if they are WIC or SNAP eligible.

Response:

The children were recruited from clinics that primarily served low income families (see methods section. During study enrollment, data was collected on: enrollment on WIC status, mother’s education and type of insurance, which were used as surrogate markers for socio-economic status (page 5, lines 21-23). The proportion of children in our sample enrolled in WIC is now reported in table 1.

2. Add sensitivity analysis OR include children with 2 days of diet recalls in your sample (Major Compulsory Revision)

Response:
Unfortunately including children with 2 days of food diaries would only increase our sample size from 105 to 109, since only 109 of the 291 participants of the micronutrient study have food diary data. The description of the sample has been re-worded to reflect this situation (page 5, lines 14-16). In response to this concern we modified table 1 (demographic data of our sample), in such way that it now includes demographic data for the full sample.

This was a secondary analysis using the data for that study, for which we acknowledge the limitation of not having had a power calculation for our specific objective in the present study in the discussion (page 17, line 1).

3. I would like to see some information on the actual number of total servings per day.

Response:

The mean total number of servings per day, as well as the range of total servings per day for our sample is now reported in the manuscript (page 10, line 8).

4. Table 3 has too much repetition of data from Table 2. Drop the median and quartile information. The column titles should be food group as % of total servings per day (Blacks), subgroup item as % of total servings per day (Blacks) and subgroup item as % of food group (Blacks); repeated for Hispanics, for a total of 6 columns.

Response:

The information originally presented in Tables 2 and 3 was condensed into one table (Table 2), for which we did all the modifications suggested (the median and quartile information was dropped and the suggested columns were included).

5. The extensive detail on median, q1 and q3 for each food group and subgroups not informative, and should be dropped. Instead, the authors could stratify the sample along the MEDIAN TOTAL INTAKE or into TERTILES OF TOTAL INTAKE, and examine the percent distribution of food groups within each level of TOTAL INTAKE. Thus, we could learn if fat consumption is disproportionately higher among children who are consuming large amounts of food compared to those whose total intake is small. Race, sex and age could be included in these models as covariates, and estimates obtained by race.

Response:

After having condensed the information previously presented in tables 2 and 3 into one table, we did an additional table (Table 3), that contains the mean proportional intake per food group, stratified by total daily caloric intake, using two categories: high and low daily total caloric intake. We used the DRI (Estimated Energy Requirements) as the cut point, yet maintained the suggestion to compare the proportional intake per food group by high or low total caloric intake. In the same table, we also presented the regression models showing
the effect of "caloric intake" (low caloric intake was reference group) on proportional intake of each food group. These models add information to the previous comparison that just used the means of proportional intake, since they are controlled for the effect of sex, age and BMI. All values presented in this new table (Table 3) are stratified by race/ethnicity, and for each value we evaluated if there was a difference by race/ethnicity (page 8, lines 7-11).

6. Table 4 – the title says “children at or above RDA level”; the numbers show children below RDA level.

Response:

The title was corrected to "below the RDA level".

7. For table 5, please indicate adequate distribution alongside the macronutrient, or as a footnote.

Response:

The adequate distribution is now indicated as a footnote of Table 5.

8. In title, use the word “across”, rather than “among”

Response:

The title now says "across".

9. Page 8, Line 7 – you want to say “complementary”, not “complimentary”

Response:

It has been corrected to say "complementary".