Author's response to reviews

Title: Dietary intakes and food sources of fatty acids in Guatemalan schoolchildren: A cross-sectional study

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Author's response to reviews: see over
REVIEWER 1 - Reviewer: Kiyonori Kuriki

QUERY 1: This study showed dietary fat intake and the material foods sorted by gender and socioeconomic status (SES), but not associations between the intake and the risks for (cardiovascular disease), obese (including over weight), higher waist circumstance and abnormal levels of serum lipids.

COMMENT FROM AUTHORS:
The aim of this study was to assess intakes of dietary fats and examine food sources of those fats in Guatemalan children. We did not intend to examine dietary intakes in relation to risk factors for cardiovascular disease. Therefore we reported our findings about levels of intake and food sources of fat intakes in our study population.

ACTION TAKEN IN REVISION: No action was taken

QUERY 2: SES was related with dietary fat intake, and therefore the intake might be one of confounding factors for the increased risks in the population.

COMMENT FROM AUTHORS: Although authors are unclear about this query, we do agree that dietary fat intake was influenced by SES of the children.

ACTION TAKEN IN REVISION: No action was taken, but please look at our rebuttal to Query 2a from Reviewer #2 (page 3)

QUERY 3: Compared with European-American school-children studies (introduced in Background), dietary intakes of total fat, SFA MUFA, PUFA, n-6 PUFA and their SE were not so high in the subjects, and the values were also almost the same levels against the corresponding ones recommended by WHO.

COMMENT FROM AUTHORS: We are in agreement with this comment. As reported in our manuscript, intakes of dietary fats were lower among Guatemalan school age children that the intakes observed in other populations (e.g. Germany and Italy). However, this better than expected outcomes may be changing rapidly as one of the documented effects of the nutrition transition, particularly in the middle stages of the transition, where we perceived that the Guatemalan population is currently.

ACTION TAKEN IN REVISION: No action was taken

QUERY 4: Their hypothetical conclusion was not conducted in the study.

COMMENT FROM AUTHORS: The reviewer is correct. We did not assess the relationship of fat intakes and anthropometric indicators. However, we found in the related literature that there could be an association between fat intakes (as well as other nutrients) and nutritional outcomes.

ACTION TAKEN IN REVISION: Responding to this query and a related one from Reviewer #2, we changed the Conclusion as: Here is the re-written Discussion: In this study we reported the dietary patterns of Guatemalan schoolchildren with respect to fat and fatty acids, which is the first report of fatty
Contrary to what reported intakes among children from North America and European countries [1-5], intakes of fat and fatty acids, particularly total fat and SFA, were much lower than the reported values in those studies, and, therefore, closer to the WHO recommendations for these nutrients [6].

However, as we documented here, the consumption of fish and other seafood was very low among boys, although they represented the important sources of EPA and DHA. These foods were non-existent among girls. The low (boys) or null (girls) intakes of fish/seafood partially explain the low intakes of EPA and DHA, which along with ALA, were the essential fatty acids found to be the most limiting in the diets Guatemalan schoolchildren. This population will benefit from a higher consumption of culturally acceptable foods that are rich in these limiting nutrients. The fact that boys reported consumption of fish and other seafood is an indicative that these foods are acceptable options for Guatemalan children.

QUERY 5: Results from the validity test were not shown in Material and Methods; each value for fat intake should be shown in the text.

COMMENT FROM AUTHORS: Reporting the validity and calibration tests for evaluating the diet collection instrument used to gather the diet data reported in this study was not the objective of this study. However, we cited the set of previously published papers related to the series of studies conducted in this population group [7-10]. We hope that our reviewers will find this as acceptable as the reviewers for the already published papers in this series. We are confused with the suggestion that each value for fat intake should be shown in the text. Opposite to this suggestion, reviewer #2 suggested not including all tabulated information into the text.

ACTION TAKEN IN REVISION: About adding fat values into the text, we took a middle point and revised the results section, making sure that all relevant information is in the text.

QUERY 6: This reviewer strongly suggests that this report should be summarized as Note, but Original article, in accordance with this journal policy.

COMMENT FROM AUTHORS: Although we respect the recommendation of this reviewer, we challenge it. We believe that we are communicating important original research findings.

ACTION TAKEN IN REVISION: We respectfully ask the Journal Editors to consider accepting this manuscript as an original article.

QUERY 7: Minor corrections suggested by Reviewer 1:
1. Abbreviation “SES” in Abstract should be shown along with the full name.
2. In Abstract, the first sentence should be changes as follows: from "dietary … is …" to "dietary … may be …".
3. In Abstract, the word "eicosapentaenoic acid" should be collectedly inputted.
COMMENT FROM AUTHORS:
Thank you for detecting these errors or omissions.

ACTION TAKEN IN REVISION:
1. We spelled out SES as suggested (see Abstract, line 32)
2. We changed the sentence (see Abstract, line 23)
3. We corrected the spelling error in "eicosapentaenoic"

REVIEWER 2, Pierre Astorg

QUERY 1: The manuscript’s clarity, exactitude, order and concision need to be improved, as well as the English. Some non-extensive indications are given below in this purpose.

COMMENT FROM AUTHORS: we appreciate the detailed review of our manuscript and appreciate the concerns of the reviewer.

ACTION TAKEN IN REVISION: We annotate after each item the action taken. With the English, four of the seven authors are native speakers of this language and they all read several times the manuscript. They will do it again looking carefully for ways to improve this manuscript.

QUERY 2a: The methodology should be described more precisely, since the quality of the study relies on it. The age of the children must be given. Was SES of children individually assessed by a questionnaire? In any case, the criteria leading to the definition of high SES (for private school) and low SES (public school) must be described, since SES is one of the factors studied.

COMMENT FROM AUTHORS: Concerned about keeping the length of the paper within certain limits, we might have lacked detailed information on the Methods section. To overcome this over-simplification, we cited our earlier publications in the series, which we hoped would reduce our word-burden for this element of the series on Quetzaltenango children [7-10].

In relation to the age of the children: In our original design, age was not an inclusion criterion for dietary intake; as we observed that in special children from public schools the attendance in age varied, because of the repentance level. The age would have narrowed our percent participation, and would have been even to comparison among SES class, in special boys. However, overall children were mainly aged 8-10.

As a criterion for defining SES, we used the type of school as a proxy measure and divider for SES for several reasons. On the one hand, it was sought to avoid a direct querying of family income as this is a sensitive and unreliable area of inquiry in Guatemala. We are not trying to make it a universal rule, although the remote chances that children from HSES attend public schools is not off possibilities. With respect to SES, past research at CeSSIAM and at the Institute of Nutrition for Central America and panama (both in Guatemala), have shown that Guatemalans are notably reluctant to respond to questions about income and household and land holdings. This often reduces participation and poses a
danger to the questioners. The study, moreover, was not designed or approved to question parents. So, proxy identifiers are most often used to estimate social class affiliations. Of course, to the extent that lower income children may attend a private school with some external support, or high income families might opt to send their children to public schools our results will be conservative estimates of the comparison. The SES comparison in this analysis is limited to the group level comparisons between private versus public school children. The reviewers of the six papers in the series (cited above) have looked favorably on our assessment of SES by the proxy of private vs. public school attendance. Not only were the private schools private and fee-requiring, but they represented the upper echelon of such schools in the city in order to produce the greatest contrast.

**ACTION TAKEN IN REVISION:** At the request of the Reviewers we have added more details to our methods section. The second paragraph in the Methods section now reads: For the study reported here, we identified a sample of 449 children (48% boys, between 8-10 years of age) with complete dietary information. Using type of school, public or private, we classified children attending public schools as of low socio-economic status (LSES, n=219) and those attending private schools as of high socioeconomic status (HSES, n=230).

**QUERY 2b:** Similarly, the method used for dietary assessment has to be described thoroughly. Apparently, it consists of a single 24h dietary record using pictures made by the children. Was it repeated over the 6-week period? Were the children guided by a list of items, or pre-existing pictures? The term “prospective” can be misleading, it suggests that several records have been done at different times.

**COMMENT FROM AUTHORS:** We apology here for the lack of clarity. The dietary data was collected for only one day of food intake. Each of the 449 participants registered prospectively their intake in a pictorial manner during a period of 24 hours, on one single registration day. The field work, consisting of the dietary data collection, took 6 weeks. We needed to extent the time during these 6 weeks because children were done in small daily “batches” to allow for tighter control and adequate time to interview each participant on the following day of their reported intake. During this interview on the second day, a trained nutritionist met with the children and, based on the drawings, children were interviewed for clarity and portion size estimates. We used food models and common household measurement utensils to estimate portion sizes. After examining better our terminology, we concur with the reviewer about confusing the potential readers by using the word “prospective” when referring to the dietary instrument.

**ACTION TAKEN IN REVISION:** We improved the text related to the dietary data collection and modified the term used to describe the dietary instrument as “single pictorial 24-hr recall”. The first sentence of the Dietary data collection section in the Methods Chapter was modified as follows: Dietary data, collected during a 6 wk period between May and June 2005, was
obtained with a single pictorial 24-hr recall complemented by a follow-on interview with a trained nutritionist.

**QUERY 3:** Individual fatty acid intakes as energy % should be reported in table 2 (the same list as in table 1). Following FAO/WHO recommendations, table 3 should also give the proportion of children with PUFA<6 % E and with total n-6 PUFA <5 % E. The Results paragraph should help the reading of the detailed tables by stressing the most important results, not repeating too systematically the tabulated values. The differences between children with high or low SES are not so great, though sometimes significant. The most striking results of this study are the very low intakes of ALA, EPA and DHA, due, for the last two, to the very low fish intake.

**COMMENT FROM AUTHORS:** These suggestions from the Reviewer are valid and we react favorably to them.

**ACTION TAKEN IN REVISION:** We added the suggested additional results to both table 2 and 3 (please see the tables, as they too long to include them in this rebuttal. We also improved the chapter about Results as suggested.

**QUERY 4:** The discussion can be improved and has to be rewritten. It should focus on the goal of the study (fat and fatty acid intake) by comparing results with those from other studies, rather than include considerations on fatty acids and health. On the whole, the intakes of total fat and particularly of saturated fatty acids by Guatemalan children are much lower and closer to recommendations than those of children from Europe or North America, which seems to show that the westernization of the diet is only partial. In contrast, intakes of ALA and of long-chain n-3 PUFA (EPA and DHA) are low. The fact girls from both groups do not eat fish at all, whereas boys do eat some fish, is of interest and would deserve some discussion. Besides, have the authors any information about the fats and oils used in their sample (or in Guatemala), which could explain low ALA intake? (see studies from Baylin & Campos in Costa Rica). In terms of nutritional adequacy, it is clear that the main point to be ameliorated in Guatemalan children is the low n-3 PUFA intakes (both ALA and long-chain PUFA), which suggests recommendations for some changes in food habits (eating fish, and choosing ALA-containing oils and fats).

**COMMENT FROM AUTHORS:** The concerns of the reviewer are valid, as our Discussion section was not well focused.

**ACTION TAKEN IN REVISION:** Now, the Discussion section is focused on the findings and its implications as related to dietary patterns of children from a society emerging to the nutrition transition. Here is the re-written Discussion: In this study we reported the dietary patterns of Guatemalan schoolchildren with respect to fat and fatty acids, which is the first report of fatty acid consumption in children from this country. Contrary to what reported intakes among children from North America and European countries [1-5], intakes of fat and fatty acids, particularly total fat and SFA, were much lower than the reported values in those studies, and, therefore, closer to the WHO recommendations for these nutrients [6]. However, as we documented here, the consumption of fish and other seafood was very low among boys, although they represented the important
sources of EPA and DHA. These foods were non-existent among girls. The low (boys) or null (girls) intakes of fish/seafood partially explain the low intakes of EPA and DHA, which along with ALA, were the essential fatty acids found to be the most limiting in the diets Guatemalan schoolchildren. This population will benefit from a higher consumption of culturally acceptable foods that are rich in these limiting nutrients. The fact that boys reported consumption of fish and other seafood is an indicative that these foods are acceptable options for Guatemalan children.

QUERY 5: The conclusion needs to be rewritten. It should summarize the study’s main results and can suggest new research and public health recommendations. There is no need to quote references.

COMMENT FROM AUTHORS: We agree.

ACTION TAKEN IN REVISION: Please see Item #4, above.

QUERY 6: The abstract must take revisions of the text into account.

COMMENT FROM AUTHORS: No comments

ACTION TAKEN IN REVISION: Changes were done throughout the abstract sections.

QUERY 7: Minor essential revisions:

COMMENT FROM AUTHORS: Thank you to the reviewer for all these needed revision.

ACTION TAKEN IN REVISION: Specific actions are included after each item.

a) Title: “Dietary intakes and food sources of fat and fatty acids in Guatemalan schoolchildren” Suggestion taken. The title now reads: “Dietary intakes and food sources of fat and fatty acids in diets of Guatemalan schoolchildren: A cross-sectional study”

b) Abstract: there is an excessive use of abbreviations, and some are not defined. Write total fat, not TF. Define SES. Done - highlighted in gray in the abstract

c) Text:
1. Line 34: “low levels” instead of “unacceptable levels” - Done - highlighted in gray

2. Lines 47-48: there is no consensus about the consequences of a high-fat diet during childhood on risk of adulthood diseases, especially the onset of overweight and obesity. What is sure, and can be mentioned to justify the interest of this study, is that fat and fatty acid intakes during childhood can have long-term health consequences. We changed that sentence, which now reads: Dietary consumption of diets high in fats and in some fatty acids during childhood can have long-term health consequences.

3. line 51 (and line 62, and in the tables): ALA (#-linolenic acid) is 18:3n-3, not
18:3n-6! Canadian Inuits eat high amounts of long-chain n-3 PUFA, not of “n-3 LA”, which does not exist! We had corrected this error, which we failed to detect. All corrections are done, and highlighted in gray, both in the text and in Table 1.

4. lines 66-67 : delete - Done

5. line 101 (and further in the text) : single pictorial 24h dietary record. We improved the sentence as follows: Dietary data, collected during a 6 wk period between May and June 2005, was obtained with a single pictorial 24-hr recall. Further corrections were done throughout the text.

6. line 119 : dietary lipids, cholesterol and main fatty acid classes ; delete line 121. Done. The sentence now reads: Our database included dietary lipids, cholesterol and principal fat classes, including saturated (SFA), monounsaturated (MUFA), polyunsaturated (PUFA), and individual fatty acids.

7. lines 124-126 : not clear. We modify the sentence: Recipes for mixed dishes were created using information from the Latin American food composition tables from the Institute of Nutrition for Central America and Panama (INCAP), [11, 12]. And we used proxy items from the USDA database to create equivalencies in nutrient content for local foods (mainly green leaves) without representation in the INCAP food composition tables.

8. line 140 (and further in the text, and in the title of table 3) : “…we defined inadequate intakes of total fat, …”. The term “unhealthy intakes” is inappropriate, use “inadequate intakes”. Done

9. line 143 : a ratio of 8 or more… Done

10. line 148 : “Main food sources…” : cancel. Done, sentence was deleted

11. line 153 : refer to table 1. Done. The sentence now reads: Intakes of dietary fats for the total sample reached 66 g of total fat, equal amounts (23g) of SFA and MUFA and 14g of PUFA (Table 1).

12. line 159 : delete. Done

13. line 171 : refer to table2. Done. Here is the revised sentence: The contribution of fats to the total energy intake in the overall sample represented 30% from TF, about 10% from each, SFA and MUFA, 6% from each, n-3 FA and LA, with no detected differences by gender (Table 2).

14. line 246 : delete - Done

15. lines 255-258 : “recommendations… protective.” : delete. - Done

16. line 277 : delete - Done

17. tables 1, 2 and 3 : see precedent remarks. - Corrections were done
18. line 426: “Table 1. Mean daily intakes (g/day) of fat and fatty acids by Guatemalan schoolchildren, by gender and SES.”  Done

19. line 426: “Table 1. Mean daily intakes (% of total energy intake) of fat and fatty acids by Guatemalan schoolchildren, by gender and SES.” - Done in title of Table 2.

20. line 436: “Table 3. Proportion of schoolchildren with inadequate intakes of fats, by gender and SES.” - Done

REVIEWER 3, Eva E Warensjo

- Major Compulsory Revisions
This study is based on the notion that increased intakes of dietary fat in childhood may predispose for obesity and chronic diseases later in life. However, I am wondering why the authors haven’t attempted to analyze the data in lean vs. overweight/obese children in addition to the SES? Also, how large a percentage of this study group were overweight and how does this relate to national figures in Guatemala.

COMMENT FROM AUTHORS:
This reviewer is correct in her interpretation of the manuscript when indicates that we make emphasis in the relationship between fat and fatty acids intakes and chronic diseases, which is controversial. Reviewer 1 also had similar concerns.
The objective of this paper was to assess intakes of dietary fats and examine food sources of those fats in Guatemalan children. In our study design we did not include the assessment of nutritional status of children. However, another research group examined this in the same population and already published their findings. In summary, they reported that when comparing schoolchildren from high vs. low SES, both, prevalences of overweight (17.7% versus 10.5%, P < 0.01) and overweight (14.4% versus 2.3%, P < 0.01), both were higher among the high SES [13, 14].

ACTION TAKEN IN REVISION: No action was taken

- Minor Essential Revisions.
COMMENT FROM AUTHORS: We appreciate all the suggestions listed below.

ACTION TAKEN IN REVISION: Specific actions are included after each item.

1. Line 62; Typo n-3 LA and n-6 ALA -- Corrections were done throughout the paper
2. Please include age of the children not just the grade. Done in the Methods section
3. Line 112 typo: bough. Corrected
4. Does all studies indicate that childhood obesity predisposes for adult obesity and subsequent disease? The association between a high fat diet in childhood and later obesity/disease is that also unambiguously proven? Please include comments if there are studies that do not show an association. Following valid suggestions from Reviewer 1, we delete some of the comments about the relationship between high fat diets and later obesity/chronic disease.

5. I guess there is a concern for report bias with the dietary assessment used in this study as well as in other studies. I think this should be touched upon in the limitations of the study. We now address more in detail this limitation in the Discussion section. The modified paragraph says: The survey approach used self-reporting by children as the data-collection strategy, with the limitations that we address here. The generic issues of precision and accuracy of 24-h recalls are widely understood[15]. Unfortunately, due to logistic constraints, we were not able to repeat the intake record, even in a subset of children, in order to make any correction for the true variance of distributions. Therefore, to respect these limitations, particularly the disadvantage of the single record data not being representative of the usual nutrient intake at the individual level, we limited our analysis at the group and subgroup (e.g. SES and sex) levels.

6. Please include the names of the abbreviated fatty acids in the table footnote. Done in Table 1

7. I am not sure if I understand entirely what the odds ratios means in this study? Please clarify. As the improved text in the Methods Chapter, under Statistical Analysis now details, we determined the prevalence odds ratios, for the risk of inadequate intakes of the fat and fatty acids listed in Table 3, due to SES. The footnote # 4 of Table 3 reads now: Differences, between SES groups, in prevalence of the risk for inadequate intakes of the fat and fatty acids listed in the table, were tested, for the total sample and within each gender group, with logistic regression models, with adjustment for energy intake in the case of cholesterol. OR= odds ratio; CI= confidence interval.

8. Could tables 1 and 2 possible be combined since there are so many tables? We are leaving tables 1 and 2 as presented because they are already large, especially after adding more details into Table 2, as suggestion of Reviewer 2. However, we will wait to hear from the Editors if they prefer us to combine those tables.
References
12. Institute of Nutrition for Central America and Panama, Pan American Health Organization: Food Composition Table. Section I. Guatemala City, Guatemala: INCAP/OPS; 1996.