Author's response to reviews

Title: Fruit and vegetable intake and characteristics associated among adolescents from southern Brazil

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Version: 2 Date: 30 June 2012

Author's response to reviews: see over
Dr. Nehme Gabriel  
Editor-in-Chief  
Nutrition Journal  

Ref.: MS: 1476289386506715  

June 30, 2012.

Dear Dr. Gabriel,  

Enclosed you will find the revised manuscript: "Fruit and vegetable intake and characteristics associated among adolescents from southern Brazil", which we are resubmitting to be considered for publication in the Nutrition Journal.

We appreciate the comments and suggestions given by the reviewers, they were all considered and the new version surely improved. The main point, to consider or not rice and beans as components of the five a day pattern of diet, was addressed with the presentation of separate analyses, with and without these items, and with an open conclusion. The acceptance of rice and beans as components of the five a day items is decisive to recognize the current pattern as adequate or not, but this decision exceeds the aims of our survey.

We look forward to hearing from you. Please, feel free to contact us if you need any additional information.

Best regards,

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Answer to the reviewers’ comments:

We thank to the reviewers for the comments, which help us to improve the manuscript.

Reviewer #1:

Title: Fruit and vegetable intake and characteristics associated among adolescents from southern Brazil

Version: 1 Date: 19 February 2012

Reviewer: Jalila El Ati

Reviewer’s report:

• General comments

The paper presents data on the intake of fruits and vegetables and their association with various socio-demographic and lifestyle factors, among adolescents, based on a cross-sectional survey conducted in Southern Brazil. This is an interesting contribution since such data are not frequent for children. It is well written, and the methodology globally appears sound, though some more details would probably be useful for interested readers. However, several issues need to be addressed.

• Major Compulsory Revisions

1) Study design and population: authors present briefly the sampling methodology used. Could they elaborate a little more on the procedure for better understanding of when the survey has been done? What exactly was this sample representative of, how many households were invited to take part, what was the response rate, and tell us what kind of sampling weighting was performed?

Answer:

We added details to the methods and results. The survey was completed in 2007, 568 adolescents, out of 604, aged 12 to 19 years, were enrolled. Thirty six adolescents from 28 households declined to participate, so 94% of the eligible were enrolled. All
adolescents living at the eligible households were sampled and the weighting, in addition to the effect of design, were taking into account to conduct the statistical analysis. It was used the complex sample module, of the Statistical Program for Social Sciences version 17.0 (SPSS Inc., Chicago, USA). [5]

**Change in the manuscript:**

_We included the description in the methods section._

A cross-sectional study was conducted on a population-based sample of both male and female 12 to 19 years-old adolescents living in the city of Porto Alegre, southern Brazil, in 2007. The city has over 1,300,000 inhabitants and the economy is based on the third sector. Participants were selected at random through a multi-stage probability sampling based on 106 of the 2,157 census sectors (geographical subdivisions of the city, as defined by the Brazilian Institute of Geography and Statistics), followed by a simple random sampling of one block in each tract, and a systematic sampling of the households from each block. All adolescents living at the eligible households were sampled and the weighting, in addition to the effect of design, were taking into account to conduct statistical analysis. It was used the complex sample module, of the Statistical Program for Social Sciences version 17.0 (SPSS Inc., Chicago, USA). [5]

_We included in the results section._

In the total, 568 adolescents, out of 604, aged 12 to 14 (n=199), 15 to 17 (n=232), and 18 to 19 years-old (n=137), 49.5% males, and 50% white skin color were evaluated. Thirty six adolescents from 28 households declined to participate, so 94% of the eligible were enrolled.

2) Diet evaluation: as FFQ was used to assess foods intake, authors give a brief account of its design, as it has already been described in a previous paper (however the reader should be able to correctly understand the procedure used without referring to another paper). Could the authors more describe how the food list has been selected? What role did the interviewer have in the strength of the results? Specific questions about fruits and vegetables intake during the 24h before the interview were added while the FFQ was validated and daily rate: why and what kind of questions were asked? What was the portion size of “rice and beans” being serving of vegetable?

**Answer:**
We extended the description of methods according to your recommendation, see below.

**Change in the manuscript:**
Details on the development and validation of FFQ were described elsewhere [26]. Briefly, the list generated to select food items that should be part of the FFQ were identified through 24h dietary recall, filled by 61 adolescents selected at schools and universities in the city and in the Metropolitan area. This list was compared to that obtained in a population-based study, conducted in another city in southeastern of Brazil. The lists were similar, but 14 food items were dropped and 64 were added retaining those food items consumed by at least 5% of adolescents, in addition to food items that represent the influence of German, Italian, Japanese, and southern Brazilian cuisine. This food list was retested and additional changes were made. The FFQ inquired about the frequency and amount of consumption of 135 items, recording amount, frequency, periodicity (daily rate, weekly, monthly, or annual), and number of months in the past year each item was consumed. Each dietary item was transformed in daily ingestion (grams), and nutrients and total energy were calculated through Support to Nutrition (NUTWIN) software, developed by the Center of Computer Science in Health of Federal University of São Paulo (UNIFESP). Energetic ingestions inferior to 500 kcal or superior to 5000 kcal were considered unlikely and excluded from this analysis. In a random sample of 127 adolescents we validated the FFQ with the average of two 24 hours recall, obtaining an attenuated correlation of 0.52 for calories [27]. Along with the FFQ, five specific questions addressed the intake of fruits and vegetables in the 24 hours before the interview, including rice and beans (five-a-day questions). They were translated from the five-a-day, the color way campaign, and adapted to Portuguese, quoting examples of fruits and vegetables of each color among the most consumed. The intake of cooked items, as rice and beans, and the portion sizes were estimated using small, medium, and large serving spoons as a reference. For the other fruits and vegetables, the portion sizes were the same as the servings used for the FFQ. Black beans are the main type of beans consumed in southern Brazil.

Daily intake of fruits and vegetable, in grams, was categorized on standardized servings, such as 1 medium sized fruit, ½ cup of fruits, leguminous or vegetables, 200 ml fruit juice, 1 cup of leafy vegetables, ¼ cup of dried fruits. The total of servings, measured by the five-a-day questions and FFQ, was computed in four groups: fruits, vegetables I (with rice and beans), vegetables II (without rice), and rice and beans. We
also classified fruits and vegetables consumed in the last 24 hours by their internal color in groups of purple or blue, red, orange or yellow, green, and white, and added the servings of different colors to generate the *Five-a-day* - the color way. The overall consumption of fruits and vegetables was categorized into three different five-a-day variables: a) five-a-day including rice and beans, b) five-a-day - the color way - without rice and beans, c) five-a-day - the color way - including rice and beans.

The interviewers were trained and a standardized questionnaire was used to collect the data. Interviewers were certified by a supervised application of approximately 10% of the sampling. Additionally, 10% of the interviews were repeated for quality control purposes.

3) Results: authors decided to include in five-a-day “rice and beans”, a typical dish in Brazil (i.e. cereal & vegetable). It would be helpful to generate both five-a-day results: with and without “rice and beans”, and assess the factors underling the two programs.

**Answer:**

We followed the suggestion of the reviewer and the overall consumption of fruits and vegetables was categorized into three different five-a-day variables: a) five-a-day including rice and beans, b) five-a-day without rice and beans, c) five-a-day - the color way - including rice and beans. The results are now presented in Tables 2 and 3 of the manuscript. See the changes below.

**Change in the manuscript:**

**In methods:**

The overall consumption of fruits and vegetables was categorized into three different five-a-day variables: a) five-a-day including rice and beans, b) five-a-day without rice and beans, c) five-a-day - the color way - including rice and beans.

**In results:**

There was no difference in the intake of five-a-day between boys and girls. The proportion of adolescents who had a five-a-day pattern was highly dependent of the consumption of rice and beans.

Table 3 shows that the intake of vegetables, with or without rice and beans, and rice and beans were inversely associated with education and directly with physical activity.
Those who had vigorous physical activity consumed more fruits and vegetables servings per day.

In discussion, we rephrase the first paragraph:
In this population-based survey, we identified a high frequency of consumption of five servings a day of fruits and vegetables among adolescents. This proportion was highly dependent on the inclusion of rice and beans, typical of the Brazilian diet, as vegetables. Our findings also showed that removing rice and beans, the intake of five-a-day was markedly reduced, and that only 22% consumed the diversity of colors recommended for fruits and vegetables.

4) Discussion: obesity was more prevalent among Brazilian boys vs. girls whereas quantitative estimated intake of fruits and vegetables intake was higher. No relations between corpulence and consumption of fruits or/and vegetables were find in this study. These results needed to be more critiqued and compared with findings of other authors.

Answer:
This study did not detect the association of BMI with fruits, vegetables, and five-to-day intake. However, boys had higher intake of vegetables, rice and beans than girls, and probably of other foods too, which could explain the association between BMI and gender. The greater prevalence of obesity for boys is different of previous findings.

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Change in the manuscript:
In the discussion (3rd paragraph):
There was no association of BMI with fruits, vegetables and five-a-day intake. However, boys had higher intake of vegetables, rice and beans than girls, and probably of other foods too, which could explain the association between BMI and gender. The

To further analyze this association, we run the analysis stratified by age, and the association between BMI and gender was significant only among adolescents aged 18 to 19 years. Since BMI does not discriminate lean from fat mass, an explanation could be the higher muscular development of boys at this age, leading to a higher consumption of fruits and vegetables.

• Minor essential revisions
1) Results, first paragr.: “Table 1 shows that boys and girls were similar regarding …….., and smoking”, should be added.

Answer: it was included.

2) In abstract, conclusion is not pertinent. Please improve it.
Answer: we changed it.

**Change in the manuscript (abstract):**

Conclusions: Adolescents from southern Brazil have a high frequency of consumption of five servings a day of fruits and vegetables, which was highly dependent on the inclusion of rice and beans, typical of the Brazilian diet, as items of the five a day diet.

• Minor corrections

1) Could the authors add in the document number of page and use double line? OK
2) Figure 1 is unreadable and poor quality: it should be improved. OK
3) Ethic considerations were presented twice on page 3 and page 5; the repeat should be deleted. OK
4) Results, first line “aged 12 to 19 years” and not “18 years”. OK
5) Note: MG appears in the author contribution section, but does not appear in the authors list under the Title. OK
Reviewer #2:

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interest.

**Title:** Fruit and vegetable intake and characteristics associated among adolescents from southern Brazil

**Version:** 1  **Date:** 9 April 2012

**Reviewer:** Renata B Levy

**Reviewer's report:**
Fruit and vegetable intake and characteristics associated among adolescents from southern Brazil.

The paper aim is to assess the intake of fruits and vegetables and their association with sociodemographic characteristics among adolescents from southern Brazil, I consider an important topic for nutrition and public health.

1) **Material and methods**
Sample size: “the sample size needed to detect a difference of one serving of fruits and vegetables a day between smoker and non smokers with a ratio of 1:1…..it doesn’t have anything to do with your paper aim, has to be explained.

**Answer:** We tested several exposures to estimate the sample size since there was no data from adolescents of southern Brazil. Smoking was one that required greater number of participants. In the manuscript we replace smoking by gender that is the current exposure for this analysis.

**Change in the manuscript:**
The sample size needed to detect a difference of one serving of fruits and vegetables a day between boys and girls with a ratio of 1:1, a confidence interval of 95% and power of 80%, was estimated at 568 adolescent participants for dietary analyses.

2) **Studied variables:** it is important to justify the choice of variables such as smoking and alcohol. How do these variables help to answer the study objectives?
Answer:
Inadequate fruit and vegetable intake has been associated with smoking, alcoholic beverages consumption, and sedentary lifestyle. Among adults these behaviors are inversely associated, but among adolescents the associations have been scarcely investigated. This point was addressed in the second paragraph of the background.

3) Diet Evaluation
Here is the article’s biggest problem. The authors considered in the computation of “five a day” the consumption of rice and beans. I unaware references that consider this foods as part of the “Five a Day”.

Answer:
This issue has been addressed by the other reviewer as well. The source of the reasoning for including rice and beans in the five-a-day is the Brazilian guideline for healthy food: Dietary Guidelines for the Brazilian Population, which recommends for adolescents a daily consumption of rice and beans, among food plants. [available at: http://189.28.128.100/nutricao/docs/geral/10passosAdolescentes.pdf]. We incorporated this reference to the background.

Change in the manuscript:
The worldwide spread of this program led to adaptations of the main messages and some of them provide further recommendations for specific populations such as adolescents [18], and for varying the colors of fruits and vegetables to assure adequate intake of vitamins and other nutrients [19].

4) Discussion
Care should be taken with the main conclusions of the study. It is unacceptable to say that the prevalence found among adolescents for “five a day” is 60%. Classification of rice and beans as fruit or vegetables is huge mistake. I suggest reviewing the classification that includes rice and beans as vegetables.

Both classifications the “Five a Day” and the consumption of “Five serving of fruits and vegetables of different colors”.

Answer:
The intake of rice and beans is part of the diet for the majority of the adolescent population and the Brazilian guidelines included them in the recommendations of food plants [http://dtr2001.saude.gov.br/editora/produtos/livros/pdf/05_1109_M.pdf]. We believe that the suggestions of both reviewers could be contemplated including the analysis of five-a-day, with and without rice and beans, in Tables 2 and 3 of the manuscript, and discussing it properly. See the changes below.

**Change in the manuscript:**

**In methods:**
The overall consumption of fruits and vegetables was categorized into three different five-a-day variables: a) five-a-day including rice and beans, b) five-a-day without rice and beans, c) five-a-day - the color way - including rice and beans.

**In results:**
There was no difference in the intake of five-a-day between boys and girls. The proportion of adolescents who had a five-a-day pattern was highly dependent of the consumption of rice and beans.

Table 3 shows that the intake of vegetables, with or without rice and beans, and rice and beans were inversely associated with education and directly with physical activity. Those who had vigorous physical activity consumed more fruits and vegetables servings per day.

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In this population-based survey, we identified a high frequency of consumption of five servings a day of fruits and vegetables among adolescents. This proportion was highly dependent on the inclusion of rice and beans, typical of the Brazilian diet, as vegetables. Our findings also showed that removing rice and beans, the intake of five-a-day was markedly reduced, and that only 22% consumed the diversity of colors recommended for fruits and vegetables.

**In conclusions:** Adolescents from southern Brazil have a high frequency of consumption of five servings a day of fruits and vegetables. This proportion was highly dependent on the inclusion of rice and beans, typical of the Brazilian diet, as items of the five a day diet.

**Level of interest:** An article whose findings are important to those with closely
related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.