Author's response to reviews

Title: The positive association between number of children and obesity in Iranian women and men: Results from the National Health Survey

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Version: 4 Date: 10 March 2008

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Thank you for consideration of our manuscript for publication in your journal. We have reviewed the above manuscript according to your reviewer’s comments.

**Reviewer's report**

**Title:** The positive association between number of children and obesity in Iranian women and men: Results from the National Health Survey  

**Version:** 2  
**Date:** 11 February 2008  
**Reviewer:** Rebecca Hardy

**Reviewer's report:**

- Major Compulsory Revisions

1. The unadjusted association between number of children and obesity should be presented as well as the adjusted one, so that the influence of the potential confounders included in the analysis can be observed.

   * The reviewer is correct and we have added these sentences to the second paragraph of the Results:

   "We started by fitting a model containing sex and number of children to observe the influence of the potential confounders included in the analysis. In the GEE analysis, the odds of obesity increased with increasing number of children: unadjusted obesity odds ratios were 1.29 (95% CI: 1.21-1.39) and 1.10 (95% CI: 1.001-1.20) for women and men, respectively. The OR of 1.29 for women was significantly different from the OR of 1.10 for men because the interaction between the number of children and sex was statistically significant (p=0.006)."

   * We have also added these sentences to the first paragraph of the Discussion:

   "In first model (without confounders), unadjusted obesity odds ratios were 1.29 (95% CI: 1.21-1.39) and 1.10 (95% CI: 1.001-1.20) for women and men, respectively. Unadjusted OR of 1.29 for women was significantly different from the Unadjusted OR of 1.10 for men."

2. There needs to be more discussion on the possible mechanisms relating to the association in women as well as men. The fact that similar associations were seen in both genders suggests a lifestyle, rather than a biologic, impact of having children in women. The extent of change in the association before and after adjustment for the confounding variables would be useful in informing this discussion.

   * The reviewer is correct and we have added these sentences (second, third and fourth paragraphs) to the Discussion:

   "Comparing two models the influence of the potential confounders included in analysis can be observed. Unadjusted ORs of 1.29 and 1.10 are changed to ORs of 1.16 and 1.18 for women and men, respectively. After controlling for potential confounders, the similar associations were seen in both sexes suggest a lifestyle, rather than a biologic, impact of having children in women."
Our findings were consistent with the conclusions of Lawlor et al. [35] and Hardy et al. [36]. Lawlor et al. [35] concluded that "Lifestyle risk factors associated with child-rearing lead to obesity and result in increased CHD in both sexes; biological responses of pregnancy may have additional adverse effects in women". Hardy et al. [36] showed that "Any association between number of children and CHD risk factors is a result of lifestyle and behaviors associated with family life rather than being as result of the biological impact of pregnancy in women".

Our finding may point toward a better understanding of the social and cultural mechanisms of obesity in couples. Most couples seem to be spending more free time with their children. With increasing number of children, couples may have little time to spend on health behaviors. For example, they don’t go to the gyms and exercise centers.

3. It is unclear what is meant by âselecting the cluster was made systematically (top of p5). The correlation between couples is correctly accounted for by the GEE model, but consideration of whether the cluster sampling should also be accounted for is required.

* The explanation for the reviewer is as bellow:

**SAMPLING**

This article is based on the results of the Second Health Survey in Iran (2nd NHS). All citizens living in Iran were considered as survey population. A household was defined as those living in the same residence, participating in the household’s expenses and usually eat together. Any individual living single was also considered a household. The statistical framework used, was based on the households’ list available with every Health Department in the provinces, usually updated annually. Sampling was conducted on the basis of the cluster method, each cluster comprising of 8 households. The process was as follows: first of all, based on population size and one-day performance capacity of the data collection group, number of clusters was identified; second, the population size was divided to number of clusters to find out the systematic cycle; third, by using simple random sampling, the first cluster was chosen from the first cycle; forth, rest of clusters were systematically selected from the rest of households’ list.

**CORRELATION**

a) We focused our study on the respondents who lived in Tehran Province only.
b) Tehran is a capital city and people who lived in Tehran are relatively more homogeneous than those living in whole Iran.
c) We excluded: 1) the households with a pregnant woman inside; 2) those households that do not include a father or a mother; 3) those households with a single person inside, from the analyses. Hence, the cluster size is reduced.
d) It was found that the correlation within households is much higher than that of between households.

As the result, we believe the right choice is to apply GEE model and consider the correlation between couples, rather than ignore it and instead, consider between households correlations. We checked this idea using SAS PROC GENMOD and considered couples, nested in households, as correlated data and realized that when couples are considered as clusters, it is not needed to consider households’ clusters.

- Minor Essential Revisions

1. Abstract: The first line of results should mention number of children first as this is the focus of the paper. Delete the first 2 sentences of the conclusions as the conclusions should relate to the findings from this specific study.
* The first line of the results of the abstract has been changed as the reviewer indicates.


* We have now included two papers (N0 35,36,41) in the References section as the reviewer indicates.

3. I think the sentence ending â##â#ï in recentâ## (without a full stop) (p3, line 7) should read â##recent years.â##

* Change made as indicated by the reviewer.

4. The sentence beginning â##Smoking cessation,â##â## (p3, start of paragraph 4) should be corrected to â##which fortunately often occurs once women learn of their pregnancyâ##â## rather than â##which fortunately occurs when their learn of pregnancyâ##â##.

* Change made as indicated by the reviewer.

5. It is stated (p5) that BMI was examined using the four WHO categories, but analyses only appear to be based on a binary outcome (obese versus not obese).

* The following statements now appear in the first paragraph of the measurements subsection of the Methods section:

BMI (Body Mass Index), our dependent variable, was calculated as weight in kilograms divided by the square of the height in meters (kg/m\(^2\)), and subjects were classified into obese (BMI ≥30 kg/m\(^2\)) and nonobese (BMI <30 kg/m\(^2\)).

6. Delete â##physical activityâ## from the first sentence of the final paragraph on page 5 as it does not relate to the economic factors being discussed in the rest of the sentence. Physical activity should be dealt with in a separate sentence, probably in the paragraph relating to alcohol consumption.

* The following statement now appears in the fourth paragraph of the Measurements subsection of the Methods section:

We had no information on physical activity and alcohol consumption (the consumption of alcohol is prohibited in Iran).
7. The definition of active workforce should be edited for clarification purposes.

* The following statements now appear in the sixth paragraph of the Measurements subsection of the Methods section:

Workforce status: The original questionnaire item included twelve response categories. For this analysis, housewife, student, retired and unemployed were grouped into one category named "nonactive workforce" vs. "active workforce" (others).

8. It is stated that the strength of the association between number of children and obesity increased: (p7). Should this read the odds of obesity increased with increasing number of children?

* Change made as indicated by the reviewer.

9. Reword or delete the sentence (p8) Patterns that could explain this association in men are not detected.

* We have deleted the sentence as the reviewer indicates.

10. Clarification of the meaning of the coefficients presented in Table 2 would aid understanding of the results. Better use of footnotes and a clearer description of the models fitted in statistical methods section and/or results are required. How the different coefficients for male and female were obtained (i.e. presumably by interaction terms) should be clarified. In particular male vs female: active workforce and male vs female: nonactive workforce are hard to interpret and the description in the footnote should be improved.

* The reviewer is correct and we have added statistical analyses subsection to the Methods. The following statements now appear in the first paragraph of the statistical analyses subsection of the Methods section:

Economic index, the number of children and age were examined as continuous variables. The other five variables were (0,1) variables. We looked specifically for interactions between sex and all covariates (sex × education, sex × smoking and sex × place of residence were not significant and we excluded these nonsignificant terms). The interaction between sex and number of children was not significant but it is sensible to include a variable that is central to the purpose of the study and report its estimated effect even if it is not statistically significant. A model containing interaction terms implies that both the estimated odds ratios and their corresponding confidence intervals vary as the values of the effect modifiers vary. A recommended practice is to use “typical” or “representative” values of variables, such as their mean values in the data for each variable.

* We have added these sentences to the finest paragraph of the Results:

Among subjects with active workforce level, the odds of obesity for men was 1.21 times that for women. In contrast, among subjects with nonactive workforce level, the odds of obesity for women was 2.44 times that for men.

* The footnotes of Table 2 now appear as:
a Body mass index 30(kg/m²) or greater
b The interaction terms were included as cross-products between sex and the predictors of interest (number of children, age, economic index and workforce level) therefore, different OR for male and female were obtained.
c Number of children, age and economic index were examined as continuous variables. Male vs. female OR evaluated at the overall mean number of children, age, and economic index.
d Among subjects with active level, the odds of obesity for men was 1.21 times that for women.
e Among subjects with nonactive level, the odds of obesity for men was 0.40 times that for women.