Author's response to reviews

Title: Association between obesity and metabolic co-morbidities among children and adolescents in South Korea: the 2007-2008 Korea National Health and Nutrition Examination Surveys

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Author's response to reviews: see over
December 14, 2013

Dr. Rafal Ilow
BioMed Central
Editor in BMC Public Health


Dear Dr. Ilow,

We are very grateful for the reviewers' constructive comments. We have revised the manuscript based on their comments. Following please find our response to each of their comment.

In addition, we have made many other changes and formatted the manuscript following the format guidelines of the BMC Public Health. Our changes in the manuscript were highlighted and a clean file was also provided.

Many thanks for your assistance. We look forward to hearing from you soon.

Sincerely,

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Authors’ response to Reviewers’ comments

Reviewer's report
Title: Association between obesity and metabolic co-morbidities among children and adolescents in South Korea: the 2007-2008 Korea National Health and Nutrition Examination Surveys
Version: 2 Date: 27 September 2013
Reviewer: Bing Lu

Reviewer's report:
Minor Essential Revisions

This is a well-written manuscript.
Response: Many thanks.

I have several questions or minor comments:

1. The study sample included 1526 subjects out of 3618 children. The possible selection bias should be evaluated. How different was the sub-sample from the total sample?
Response: To evaluate the potential selection bias, we compared the selected key characteristics, eg, age, gender, and household income etc., between total sample and sub-sample. However, there was no significant difference between the sub-sample and the total sample. Moreover, due to a lack of nationally representative data, our data, the Korea National Health and Nutrition Examination Surveys, is the only available data set that can be used to examine the levels of biochemical indicators and estimate the prevalence patterns of diseases at national level, although the data has some limitations, eg. missing values. There are several previous studies using a KNHANES to define their prevalence of metabolic disorders among children which have similar data limitations (eg. Park et al., 2009; Kim et al., 2006; Park J et al., 2010). We are aware of such limitations and noted the issue in the discussion part.

[References]


2. Given the cross-sectional design, the paper should discuss the limitations in depth, including possible recall bias, reverse-causation bias, etc.

Response: We addressed these issues in the limitation and added some other discussions of limitations in depth. But recall bias is not a concern because the key variables used are measured, but not self-reported, such as anthropometric measures, blood pressure, and lipid profiles. In the manuscript, we added:

“Our other hand, our study could not employ longitudinal models due to data limitations which preclude causal inference and the estimates may suffer from problems such as reverse causation. In addition, subjects were excluded in the analysis if any among components of weight and metabolic comorbidities were not measured, which limited our sample size and could potentially introduce selection bias. However, we explored the possibility of potential selection bias and our analysis did not suggest significant difference between the study sample and the whole sample. Moreover, the KNHANES is the only available data set that can be used to examine the levels of biochemical indicators and estimate the prevalence patterns of chronic conditions at a national level. However, despite of the limitations, such as missing values, existing studies indicate that KNHANES can still provide valid and reasonably representative estimates, e.g. the prevalence of metabolic disorders among children”

3. The analysis used many cut-off points to defined obesity, central obesity, such as, WC>90th percentile, BMI>85 percentile, it is not clear these cut-off points were based on your sample, or national criteria.

Response: Our used cut-off points were based on national or international criteria, but not based on our sample. We provided the definition of criteria and its references in the methods.

4. PAR % was full PAR or partial PAR? Another word, did you adjust for other covariates in PAR calculation?

Response: PARs presented are unadjusted PARs, estimated based on the method developed by Fleiss to calculate population attributable risk in a cross-sectional study. We have added footnote to clarify this.


For your information, there are several published studies using the methods to calculate PARs in a cross-sectional study.


5. Table 1 and 2 should be combined into one table. Using categorical or continuous scale should be subject to clinical sense.

**Response:** We have revised as suggested.

Level of interest: An article of outstanding merit and interest in its field
Quality of written English: Acceptable
Statistical review: Yes, and I have assessed the statistics in my report.
Declaration of competing interests:
'I declare that I have no competing interests
Reviewer's report
Title: Association between obesity and metabolic co-morbidities among children and adolescents in South Korea: the 2007-2008 Korea National Health and Nutrition Examination Surveys
Reviewer's report:

This manuscript describes the prevalence of childhood overweight and obesity in a population that has received little research attention. The comorbidities associated with overweight/obesity are also highlighted. The topic of this manuscript is extremely well suited to BMC Public Health audience. The authors should be commended for using a rich dataset with many biochemical parameters that is novel to a North American audience.

Response: Many thanks.

- Major Compulsory Revisions
1. The largest issue the authors need to address is the statistical approach to analyzing the relationship between overweight/obesity and comorbidities. The relationship between excessive adiposity and their associated comorbidities are widely accepted. The more relevant question for this population is at what level of BMI, do these conditions start to appear especially among diverse populations. Also it is always a drawback when researchers analyze a continuous variable such as BMI as a dichotomous variable.

Response: 1. To our knowledge, the relationship between overweight/obesity and comorbidities is still not well established, especially across various populations. As we explained in the paper, “Little is known about the association between weight status and metabolic co-morbidities among children in South Korea. Previous studies were mainly based on data that were 10 years old, and the gender-age specific associations between the metabolic co-morbidities and weight status outcome have not been sufficiently examined.”

2. To study the relationship between weight status across the distribution of BMI is interesting and important, and is what we are studying in several of our other ongoing projects. However, this study focused on the risk of overweight and obesity in Korean children. We think exploring the risk of other cutoff points is beyond the scope of this paper.

Response: 2. Another large issue is the number of missing data. The authors need to examine this statistically and consider it in their discussion section.

Response: Done as suggested. To evaluate the potential selection bias, we compared the selected key characteristics, eg, age, gender, and household income etc., between total sample and sub-sample. There was no significant difference between the sub-sample and the total sample. Moreover, the Korea National Health and Nutrition Examination Surveys are the only available nationally representative data set that can be used to examine the levels of biochemical indicators and estimate the prevalence patterns of diseases at national level, although the data has some limitations such as having missing values. The missings are likely random as indicated by our above presented comparison analysis. There are several
previous studies using a KNHANES to define their prevalence of metabolic disorders among children which have similar data limitations (e.g. Park et al., 2009; Kim et al., 2006; Park et al., 2010). We are aware of such limitations and noted the issue in the discussion part.

**References**


- Minor Essential Revisions

**Introduction**

1. The introduction would benefit from a small description about the overall health conditions found in South Korea and perhaps a summary of the earlier survey findings.

**Response:** As the reviewer suggested, we added this in the introduction.

“As South Korea became industrialized, energy intake and sedentary activities (e.g., screen time) have increased. Based on 2011 Korea national health statistics, the prevalence of obesity (BMI ≥ 30 kg/m²), hypertension, diabetes, hypercholesterolemia, and hypertriglyceridemia among Korean adults aged 30 and older is 34.2%, 30.8%, 10.5%, 14.5%, and 16.5%, respectively. Besides, it has been on the rise [4]. The prevalence of childhood obesity has increased from 5.4% in 1998 to 10.8% in 2008 in South Korea, although it is still low compared to Western countries [5, 6]. Moreover, weight misperception (51.6% of boys; 48.6% of girls) is common based on the 2009 nationally representative data among Korean adolescents. It is strongly associated with poor eating behaviors, and stress or depressed moods [7]. Little is known about the association between weight status and metabolic co-morbidities among children in South Korea [6]; previous studies were mainly based on data that is 10 years old, and the gender-age specific association between the metabolic co-morbidities and weight status has not been sufficiently examined.”

2. In the purpose statements it is unclear what key components the authors are discussing.

**Response:** We make it clear.

“We also investigated the key component among metabolic co-morbidities of overweight/obesity”. L. “We also investigated the aspect of metabolic co-morbidities in overweight /obe children”.

3. It is also unclear how the results from this work will guide the development of effective programs for children’s health. This work highlights the need for programs and can help
target interventions. Thus the second justification regarding targeting screening initiatives is appropriate.

Response: We have revised as suggested. We deleted the sentence regarding the development of effective programs for children’s health.

Methods
4. Pg 5: ..by Helsinki. The authors are missing text here.
Response: We revised the sentence as following:
“
The KNHANES IV was approved by the Korea Centers for Disease Control & Prevention Institutional Review Board.”

5. Pg 7-8: The definition of metabolic comorbidities would fit well in a table. It already appears to be a table in the text.
Response: Revised as suggested.

6. Pg 8: Why are the authors using both household income and the quartile of average household monthly income as control variables?
Response: We have only used the quartile of average household monthly income as a control variable. It was clarified in the method.

Results
7. Table 1 appears to be missing footnotes Atherogenic Index 6?
Response: We added the footnote as suggested.

Discussion
8. Also a discussion on the possible reasons why boys would more likely experience the associated comorbidities is needed.
Response: We provided some more discussion about the possible reasons / gender differences.

“Boys had higher metabolic outcomes such as BMI, WC, BP levels and waist-to-height ratios; whereas, girls had higher TC and HDL levels. These gender differences were consistent with previous findings in other studies among adolescents in China [30] and even young adults aged 15-39 years among Asian Indians [36]. Likewise, boys may be the more vulnerable than girls to the risks of childhood metabolic disorders. Studying the reasons for boys’ higher risks could shed some light on why the metabolic disorders are generally on the rise. Based on the same KNHANES 2007-08 data, South Korean men aged 20-65 years suffered worse metabolic outcomes than women (all P < 0.05), e.g., MetS: 15.8% in men vs. 11.6% in women, and had a higher average number of metabolic disturbances [37].”

Level of interest: An article of importance in its field
Quality of written English: Needs some language corrections before being published
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I have no competing interests.