Author's response to reviews

Title: Influences of socioeconomic factors on childhood and adolescent overweight by gender in Korea: cross-sectional analysis of nationally representative sample

Authors:

- Jin-Won Noh (jinwon.noh@gmail.com)
- Young-eun Kim (kimyes@neca.re.kr)
- In-Hwan Oh (parenchyme@gmail.com)
- Young Dae Kwon (snukyd1@naver.com)

Version: 3  
Date: 18 January 2014

Author's response to reviews: see over
Dear editor-in-chief,

Thank you for the kind and thoughtful opinion. It makes our paper more interesting and meaningful. We tried to do our best to revise the paper upon referee’s advices. We addressed the comments in a revised manuscript. Here below is the detail explanation giving a point-by-point response to the concerns.

Subject: MS: 5422170161117657 - Influences of socioeconomic factors on childhood and adolescent obesity by sex in Korea: cross-sectional analysis of nationally representative sample

Referee 1: Jinming Yu

Major Compulsory Revisions

1. Methods part. The authors stated that the study subjects were selected using stratified probability proportional to size method from 12 cities. How the stratification was conducted? Specifically, how each subject was selected? Did the author select a whole school, grade, or class?

- The study population ranged in age from 10 to 18 years and was selected from 12 cities in Korean provinces except for Jeju Island and included a total sample of 10,156 children and adolescents.

- The study has used stratified cluster sampling that can represent the population. It was conducted like below;

1) Stratum: Allocation target sample population by proportion of the number of students by stratification from 12 cities

2) Decided the number of schools according to allocated sampling number

3) Cluster: selecting allocated school per stratified cities (Sampling with Probabilities Proportional to Size, which is applied the number of students per school)
4) Choosing one grade from selected school

5) Sampling: random selection of one class among number of class of selected grade by random number and

6) Face to face interview of all students of the selected class

2. Methods part. How the weight and height of study subjects were measured? Was it self-reported? If it was self-reported, did the author assess the validity of the self-reported weight and height before?

Ł It was measured by self-reported. There was no validity test. We added this as a limitation of this study. However, the trained interviewers asked structured questionnaires to get more accuracy answers.

3. Methods part. The authors did not state which variables were considered as confounders and how they were measured.

Ł We added on statistical analysis part of the method section about which variables were considered as confounders like below;

“Logistic regression was used to calculate the odds ratio and 95% confidence interval, while adjusting for possible confounders. We considered gender, education, region, parent’s education level, parent’s employed, parents interest in weight control, parent’s body shape, family structure as potential confounders.”

Ł We added on variable part of the method section about how the variables were measured.

4. Diet, nutrition intake, and physical activity are most important factors those might confound the association of SES and obesity, did the author consider these variables?

Ł The data utilized in this study came from Korean Survey on the Obesity of Youth and
Children in 2009 conducted by the National Youth Policy Institute (NYPI). Therefore, we used secondary data and there were no variables in that survey. There were no variables about diet, nutrition intake and physical activity. However, the author tried to figure out those variables indirectly by parent body shape and parental interest in weight control.

5. Methods part. Although the authors asserted they were only interested in overweight and obesity. It might be more interesting if they included those who were underweight and analyzed the association between SES and underweight.

Ł We agreed the reviewer’s recommendation. However, our subject was focused on only the difference of SES between normal and overweight. There are big difference characteristics about the association between SES and underweight. It could be another subject. There are also many previous studies only considered on overweight [reference number: 6, 16-18]. Please consider this and the authors wanted to focus on and highlight only the characteristics of SES between normal and overweight.

6. Statistical analysis part. The authors stated that variables were selected using backward elimination and P-value < 0.20 was considered as independent variables. There are many drawbacks using stepwise methods in regression models (Prof. Frank Harrell). The authors should not use this method in risk analysis models.

Ł We know the stepwise procedure’s drawback. Nevertheless, a stepwise procedure was run on the data and the results concerning the important correlates were not altered. And main confounder (e.g. gender) included final model, so we used stepwise procedure as the ‘additional’ analysis.

7. Statistical analysis part. Did the authors check the interactions between the variables?
We checked interaction effect between economic status and confounders, the interaction effects were not significant.

8. Statistical analysis part. Did the authors take into consideration of sampling design in their analysis?

We need to weight value of sampling to take into consideration of sampling design. However, there is no weight of sampling in our data source. So we couldn’t consider this one.

9. Discussion part. More discussion is needed for the mechanism of SES on overweight.

As per recommendation, we added the mechanism of SES on overweight.

On the previous study, it is proposed that objective SES, subjective SES and obesity affect each other. For example, objective SES has an effect on obesity by diet, physical activity or stress. Also subjective SES has affected the incidence of overweight by stress and psychological sequelae such as social isolation. Also overweight results in both objective SES by stigma and discrimination and subjective SES by cultural norms and stigma. Therefore, it is appropriate to consider the various SES indicators including objective and subjective SES indicator because both could affect health outcomes by independent.


Minor Essential Revisions

10. For studying SES, it would be better to use “gender” rather than “sex”.

We changed the word from “sex” to “gender”
11. Page 2, Abstract-Methods: “The data…come from…” should be changed to “came/was”.

Ł We changed the word from “come from” to “came from”.

12. Page 2, Abstract-Methods: “was missing (n=591) and underweight…” should be “…or…”.

Ł We changed the word from “and” to “or”.

13. Page 2, Abstract-Results: “sex, age, parental interest in weight management of children,” should be “gender, age, and parental ….”

Ł The word is changed.

14. Page 2, OR and CI should not be abbreviated.

Ł The abbreviated of OR and CI is all written down.

15. Page 2, since in the Conclusions part, the authors stated that “parental body shape is an important…”, it would be better if the results of “parental body shape” could be presented in Results part.

Ł We revised the results adding the “parental body shape”.

16. Page 4, “most results have been mixed” and ”leading to mixed results”. The word “mixed” might be changed to “inconsistent”?

Ł The “mixed” changed to “inconsistent”. 
17. Page 4, “The data …come from…” see comments 11.

Ł We changed the word from “come from” to “came from”.

18. OR and CI should not be abbreviated in their first presence.

Ł The abbreviated of OR and CI is all written down.

19. Table 2 legend. “Univariable logistic regression…” But in the statistical part, the authors stated they used chi-squared test. These should be made clear which method they used in Table 2.

Ł we changed the table2 title to “Univariable analysis for childhood and adolescent overweight”

20. Table 3. Categories with OR=1 as reference should be listed above other categories.

Ł We changed the order.

21. Table 3. The authors should explain which variables were included in Model 1 and Model 2 in statistical analysis part as well as table foot note.

Ł We added the footnote.
Referee 2: Eimear Keane

Reviewer's report:

Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

Aim of the study: I think that the aim of the study needs to be defined better. One full paragraph in the introduction relates ‘parental interest in weight management’ and this is not incorporated in the aim. Why give so much detail on ‘parental interest in weight management’ if it is not important to your aim?

We revised the introduction to emphasize on aim of this study.

Methods section: It is unclear from the method section, did the parents provide consent or was it the children who provided assent to partake in the study? I also feel it is essential to include an ethics statement in the methods section regarding ethical approval of the ‘Korean Survey on the Obesity of Youth and Children’.

Parents provided consent and got an explanation letter of this survey. The children also get full information of this study and provided assent.

We got IRB at Eulji University and wrote on the method section like below;

“This study was exempt from full review by an ethical committee at Eulji University (EU12-18)”

Methods section “variables”: I feel that it is essential to state that the height and weight variables are self-reported. This is currently not clear until the conclusion.

It added on the method section.
Also, I don’t feel it is necessary to mention the WHO, CDC cut offs in the methods section as these do not relate to the methods used in this paper.

We erased the WHO and CDD cut offs.

Why were overweight and obese collapsed into one variable? The sample is large enough for two separate groups “overweight” and “obese”.

The sample is large but the percent of obesity is 3.83% only because Korean childhood and adolescent obesity ratio is not that big. However, it is getting serious and social issue than before. Therefore, we focused on the overweight problems. Participants were classified using the extended International Obesity Task Force (IOTF) BMI cut-offs, which is age and gender specific cut-off points that are extrapolated from the adult BMI cut-offs of 25 kg/m². This is the frequency of overweight and obesity.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight</td>
<td>1430</td>
<td>16.72</td>
</tr>
<tr>
<td>Obesity</td>
<td>328</td>
<td>3.83</td>
</tr>
</tbody>
</table>

My understanding from the “variables section” is that all variables are child/adolescent reported? Please make same clearer.

All variables are self-reported by child/adolescent and the author added that sentence on the variables section.

Is the scale used to access “subjective economic status” validated? Please state same. Are any of the included questions validated?

There is no validation test of subjective question. We added this as a limitation of this study.
The methods section states “Parental education level was divided into four categories” but only 3 categories are presented in the tables. Please address this issue.

We changed to 3 categories.

Methods section “statistical analysis”: I feel that this section needs more detail. In particular, this section needs a justification regarding why table 4 is stratified by gender and all other tables are not stratified. Are all p-values two-sided? For the backward elimination, were the variables removed one by one? If so, perhaps include some details regarding same in a footnote under tables 3 and 4?

We added more detail and revised on the method section like below;

“Logistic regression was used to calculate the odds ratio (OR) and 95% confidence interval, while adjusting for possible confounders. We considered gender, education, region, parent’s education level, parent’s employed, parents interest in weight control, parent’s body shape, family structure as potential confounders. As well as significant variables, place of residence was considered as an independent variable as well, because it is usually used as a proxy measure for economic level in Korea, although it was not significant in the univariable analysis. Additionally, whether or not individuals lived with their parents and education level of the parents was considered as an independent variable for adjustment. Confounder variables and independent variables were included in the final logistic regression model. We checked interaction effect between economic status and confounders, the interaction effects were not significant. So, we considered main effect model. And we analyzed the stratified logistic regression by gender.”

Finally, as the authors discussed, it is suggested that there might be gender difference of the association between SES and childhood obesity. Indeed, there are references about between parental overweight and childhood overweight by gender and the results are conflicting: some found different association in parental overweight between boys and girls, whereas others did
not.

“All of the statistical analyses were two sided, and $P < 0.05$ was considered significant.”

We added footnote on the table 3 and 4.

The results section states “As well as significant variables, place of residence was considered as an independent variable as well, because it is usually used as a proxy measure for economic level in Korea, although it was not significant in the univariable analysis. Additionally, whether or not individuals lived with their parents and education level of the parents was considered as an independent variable for adjustment.” I would recommend moving this detail to the methods section under “statistical analysis”.

We moved the sentence and revised method section.

I am unclear of the value of stating “For multivariable analysis, multiple logistic regression analysis was employed using variables with a p-value of less than 0.20 as independent variables”. Four variables from 5 with a p-value greater than 0.20 were then included in multivariate analysis regardless of the p-value?

We rewrote all the method section more clearly. Below is the part of the method of multiple logistic regressions.

“For multivariable analysis, multiple logistic regression was employed using all potential confounders. Additional statistical adjustments were performed using backward stepwise logistic regression for potential confounders. And multivariable logistic model was employed using variables with backward stepwise logistic regression.”

Have you completed a chi-squared analysis to compare your SES variables?

Yes, we have.
In the discussion you refer to the possible advantages/importance of asking adolescents to report “household economic status” but how well do these responses relate to the other SES variables? Some of this information could be reported in the text of the results?

The relationship between household economic status and other SES indicator such as education of parents is not conducted. But Goodman et al reported that subjective social status (familial placement in society) has correlated with objective SES [education level and household income acquired from parents (Spearman’s rho=0.25 and 0.27 respectively, P<0.001)]. (Ref: Goodman E, Adler NE, Daniels SR, Morrison JA, Slap GB, Dolan LM. Impact of objective and subjective social status on obesity in a biracial cohort of adolescents. *Obes Res* 2003;11:1018-26.)

Discussion: In the limitations, please state ‘parent body shape’ variables are also self-reported.

We added the limitation.

I would be quite concerned that the findings of this study may be quite biased due to the self reported nature of the variables. It is likely that self reported height and weight and underreported. I am not sure if there is literature available regarding the ability of children/adolescents to accurately report parent size? The dichotomous nature of the “parents occupation/job” means that there is no differentiation between those who have professional jobs and those who have unskilled manual jobs.

Though there are lots of research on the association between parents’ recognition and children’s BMI status, it is scarce on the children’s recognition on parental BMI. We explained much detail the limitation of children’s report of parental body shape. Also our data only include the information on employment status. Therefore, it is hard to classify the job that the parents have. We included these points to the manuscript.
New manuscript: Parent body shape variables are also reported by children. This could result in over or underestimation of association between children and parent BMI. Similarly, because the employment status is only classified as hired and non-hired, the detailed situation of employment such as professional job or unskilled job is not considered.

I am also uncertain how comparable the “family affluence scale” is to the “household economic status” variable in your study. As you discuss the “family affluence scale” and the HBSC study in quite some detail, it would be good to know which of your SES variables relates best to this “family affluence scale”. Please make discussion of same clearer.

FAS was developed to reflect family material affluence/deprivation more exactly rather than parental occupation or education did (Currie et al, Researching health inequalities in adolescents: the development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale. Soc Sci Med 2008, 66(6):1429-36). As a result, FAS is the objective indicator. Contrary, household economic status is measured by children and adolescents, and it could be subjective SES rather than objective SES indicator. Therefore, FAS is closely related with parental occupation or education as an objective indicator rather than subjective household economic status as a subjective indicator. We described more detail about the objective and subjective SES indicators.

New manuscript:

In this analysis, objective SES and subjective SES indicator were considered altogether. Education level of parents and employment status could be regarded as the objective SES indicator. On the contrary, the subjective household economic status is recognized by adolescent, and therefore it could be the subjective SES that the adolescent perceived.
Referencing: Ensure to provide reference where necessary. For example, paragraph 5, sentence 1 in the introduction, needs a reference/s. Use of the term ‘conventional socio-economic variables’: this needs to be explained more clearly, perhaps this could be stated in the introduction, some details given on the limitation of ‘conventional socio-economic variables’ and what your study has to add. Headings in results: “Effects of SES of parents on obesity of children”: This does not compare fully to text under heading. Consider rephrasing heading Tables: Variable labels vary between tables. Please be consistent.

We used the conventional socio-economic variables as the meaning of “traditional socio-economic variables such as income, occupation and education (Goodman et al, 2001). For the clarification, we change the term “conventional” to the “traditional”. Also we changed the relevant sentences.

New manuscript:

Previous studies regarding adolescent overweight have been conducted with unrepresentative samples and measured by traditional socioeconomic variables such as income and education level of parents only, leading to inconsistent results.

Writing: The use of the English language is not always appropriate. There are issues with (1) tenses (2) sentence structure and (3) the use of non-scientific phraseology throughout the manuscript. Examples: The last sentence of paragraph one and the first sentence in paragraph 2 in the introduction need to be restructured. The point being made in the last sentence of paragraph two in the introduction is not clear.

We addressed the structure and rewrote the paragraph and sentences.

Tables: Please ensure percentages add to 100% Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)
Methods: Please remove ‘results’ from methods section. Example: “In total, we analyzed 4,706 male subjects and 3,849 female subjects” and “The total sample of 8,555 subjects showed a BMI range of 14.1 to 40.6 with an average of 20.3”. I feel that such details should only be given in the results section.

Results: General characteristics of subjects: shorten same, is repetitive of details in table 1. Alternatively, you could include some confidence intervals for prevalence overweight, obese etc just to make this section more detailed.

Table 1 is the demographic characteristic and table 2 is the demographic characteristic by level of overweight. And there is prevalence of normal and overweight in the table 2.

Variable: “Educations” is a proxy for age. This is important. Thus this should be stated

Discussion/conclusion: You state more research needed to find out what sort of SES questions are appropriate for children/adolescents but would you recommend the use of the SES variables in your paper for other studies?

Our studies showed that the SES could impact children and adolescent by various ways. For example, objective indicator is related with female’s overweight. On the contrary, subjective indicator is related with male’s overweight. Therefore, SES indicators which include objective
and subjective indicator should be considered to measure children and adolescent’s SES. We added it to the manuscript.

Therefore, it is appropriate to consider the various SES indicators including objective and subjective SES indicator because both could affect health outcomes by independent ways.


I suggest that maybe some subheadings should be used in the discussion as it is quite long and needs some more structure.

As per the recommendation, we added the subheadings.

Shorten paragraph 2 of discussion. It is very long and I think it is slightly off point, especially the last few sentences regarding GDP. Perhaps your discussion needs to state that your findings should be interpreted cautiously due to the limitations of the self reported variables

As per the recommendation, we restructured the paragraph. Also we added the limitation of self-reported variables.

New manuscript:

This study, which used nationally representative data of Korea, reconfirms that the relationship between overweight and SES among Korean children and adolescents reflects that of developed countries, where the prevalence of obesity is inversely associated to SES. In the 2009/2010 HBSC study, 13 of 39 countries showed a statistically significant association between low FAS and obesity in both gender. In addition, another eight countries showed an inverse relationship
between obesity and FAS in females. Additionally, the findings of this study also correspond with Korean adult women’s obesity patterns.

These limitations exaggerated the need for careful interpretation of this study and further research on adolescent overweight.