Reviewer’s report

Title: Maternal lifestyle characteristics (physical activity, smoking habits and alcohol consumption) during pregnancy, and the risk of obesity in the offspring: a study of 5,125 children

Version: 2
Date: 28 December 2014

Reviewer: Min Hae Park

Reviewer’s report:

The question of which modifiable maternal characteristics are associated with overweight and obesity in the offspring is an interesting one, that could identify potential targets for childhood obesity prevention interventions. However, there are a number of limitations related to the analyses which make it difficult for this question to be answered satisfactorily by the study in its current form.

- Major Compulsory Revisions

1. In the regression analyses, the authors do not appear to have considered or adjusted for potential confounders of the associations between maternal characteristics and offspring overweight/obesity, e.g. how much of the association between GWG and childhood weight status could be explained by physical activity during pregnancy, birth weight, maternal weight status pre-pregnancy, or child lifestyle characteristics etc? Clarification of the hypothesised relationships between the explanatory variables, key covariates and outcomes would be helpful, and could also inform the development of multivariable models that take into account alternative explanations. It may also be interesting to conducted stratified analyses that explore whether there is any effect modification of the relationship between risk factors and childhood obesity, e.g. is the relationship between GWG and childhood overweight modified by maternal weight status at baseline?

2. More detail is needed about how variables were selected and categorised for analyses:

Physical activity: there is a long explanation of different types of physical activity, but no clear description of how questionnaire responses were categorised for analysis - e.g. how were categories of often, daily, sometimes per week defined? Were activities categorised according to frequency, intensity and/or duration? It may help to describe the questions used in the questionnaire, and to describe whether the questionnaire was validated in any way - it seems the potential for recall bias is extremely high given that women were asked about their physical activity more than 8 years previously.

More careful consideration of the choice of explanatory variables is needed. E.g. is it useful to treat gestational weight gain as a continuous exposure in kg? Given that virtually all women will gain weight during pregnancy, it does not seem useful
from a policy perspective to know that each 1kg increase in weight during pregnancy is associated with increased odds of overweight/obesity in the children. A more useful/important question might be: what is the level of gestational weight gain above which there is an adverse effect on childhood weight status?

Line 196 refers to weight weight gain 'above the one recommended' - it’s not clear what this means, given that methods do not describe this.

GWG - what were the average gestational ages at which the first and last maternal weights were assessed, and how were variations in gestational age at measurement taken into account?

Please clarify whether standard BMI cut-offs (25 kg/m², 30 kg/m²) were used to assess weight categories in women at the end of pregnancy.

3. The discussion will need to be modified in accordance with updated analyses. As it stands, the conclusions overstate the findings, given the many limitations of the dataset and analysis, and recommendations do not seem to follow directly from the findings.

- Minor Essential Revisions

1. The title refers to maternal lifestyle characteristics (physical activity, smoking habits and alcohol consumption) without mention of age or gestational weight gain.

2. Abstract - positive results are selectively reported - the effects of age and alcohol on childhood overweight/obesity should also be reported. A 95% CI should be given for the OR for GWG. The recommendations do not follow directly from the study findings given that a causal effect of maternal smoking and physical activity on offspring weight status cannot be established from these analyses.

3. Introduction - the rationale for the choice of variables could be strengthened, giving a sense of why this analysis is needed.

4. More information on the response rates to the questionnaire is needed - it is reported that the 5,125 women in the sample are those of the 5,500 with complete data, but there must also have been women who could not be contacted or refused to participate in the study - these rates should be reported and the implications considered in the discussion. Furthermore, the decision to include underweight babies and macrosomic babies in the dataset should be discussed.

5. Statistical analyses line 157 - would recommend using term 'mean' rather than average. Line 159 - clarify that BMI categories refer to those for children.

6. Results - text refers to tertiles, but table 1 presents quartiles - authors should be consistent unless there is a good reason for presenting both. Could alternatively provide standard deviation as a measure of distribution.
7. Given that it is the main outcome, the % of children that were overweight and obese at age 8 should be reported.

8. Discussion needs more critical review of the study limitations, e.g. data availability, response rates.

9. Some review of the English is recommended, e.g Introduction line 43 ('act synergistically by burdening health of individuals'), line 49 ('its risk' - what risk does this refer to?), line 54 ('the increasing trend' - it's not clear what trend this refers to)

10. ORs are given to 3 decimal places - 2 d.p. are sufficient.

**Level of interest:** An article of limited interest

**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