Reviewer's report

Title: Glucose Intolerance and Gestational Diabetes Risk in Relation to Sleep Duration and Snoring During Pregnancy: A Pilot Study

Version: 1 Date: 19 February 2010

Reviewer: Edwina Yeung

Reviewer's report:

Summary
The authors conducted a prospective study of the association between sleep factors in early pregnancy (snoring and sleep duration) and the risk of gestational diabetes (GDM). They also investigated the association between continuous measures of glucose during the 50-g GDM screening that all women received and sleep factors. This study was nested in a cohort of 1290 women attending two prenatal clinics in Seattle, WA. The study found that snoring and very low sleep duration (#4 hours) were each significantly associated with increased mean maternal 1-hour glucose during the screening test. Due to the small number of women who developed GDM (n=68), they found relative risks suggestive of associations between sleep factors and GDM but none reached statistical significance. They further tested for interaction between overweight and sleep factors and also found that overweight snorers had higher risk than overweight non-snorers for GDM but the interaction did not prove to be significant.

Major Compulsory Revisions
- There needs to be a clearer rationale for why the interaction between overweight and snoring was tested. (i.e. p.7 under the hypothesis statement) According to the beginning of the introduction, the authors stated (with good evidence) that lack of or poor sleep quality has been shown in other studies to be associated with obesity. Thus, the causal diagram between sleep and GDM might have been through the mechanism of overweight not modified by it? Regarding results to table 3, these are essentially repeated analyses of the right side of table 2 using a singular reference group. However, it is unclear why the authors stated "insufficient data" in both tables as there is data (albeit very imprecise due to only 1 GDM case who was lean and snores). If there isn't sufficient data, the interaction with overweight should not have been investigated at all.

- If snoring/sleep deprivation leads to obesity as the author had reviewed for evidence of such in the introduction, then the interpretation of the increased risk with snorers among overweight women is probably due to residual confounding by BMI (i.e. overweight women who snore tend to have larger BMI than overweight women who do not). An analysis adjusting for BMI may be more informative than stratifying and testing for interaction. If the association is independent of BMI, it may show better evidence of an independent pathway.
Further adjusting for BMI in the continuous analysis with glucose values from the GDM screening test would be informative too for the same reasons. One reason the authors may not have included BMI is that they used a statistical definition of confounding rather than using the a priori knowledge that they summarized on the causal relationships between these factors. The authors in their statistical methods mentioned that all covariates were included if they altered the RR by 10% or more. Previous research has shown that this is not an optimal method of determining confounders (Hernan et al Am J Epidemiol 2002;155:176–84). Multiple models, one showing age and race adjusted and another additionally adjusting for BMI may be more informative.

For GDM and sleep duration - power of detection may have also been influenced by the use of 9 hours as the reference when there was no clear indication that this was beneficial over 5-8 hours. Even in continuous association (p.9) the authors stated that the difference in glucose was 2.3mg/dl but with range overlapping 0 (p=0.27). It was not well justified therefore why the authors decided to group the women in this way.

Minor Essential Revisions
- Readers may want to know the sample size of women for which the GDM diagnostic testing was required but was unable to locate that information. (i.e. for figure 1b)
- The analysis performed in the bottom of page 10 for the risk per hour of nightly sleep may have been unnecessary as it does not give more information due to imprecise estimates. The assumption of a linear trend in risk again does not seem justified as Figure 1a shows that the confidence interval for GDM risk overlap greatly for sleep in the 5-9 hours range.
- Bottom of page 7 "glucose intolerance and GDM risk" - as "glucose intolerance" was never tested in the sense that there are clinical definitions (IGT/IFG), the authors may want to use another term ("glycemia"?). It was also used in the abstract.
- Minor error on p.13 sentence should read "OR=7.0; 95%" not "OR=7.0; 955"
- The phrase "Data not shown" on page 9 can be removed as data was shown (the beta and 95% confidence interval...)

Discretionary Revisions
- Abstract: not need to state RR=6.91 for last sentence of results section as the sentence already states "6.9-fold..."
- The sentence on P. 8 stating "All reported confidence intervals were calculated at the 95% level" can be removed as this was already mentioned on p.7.
- p.12 on the discussion of the association with greater sleep duration with T2D/GDM- maybe mention how that association could be due to subclinical disease?
- p.14 - grammatical error - sleep duration and snoring "were" rather than "was" obtained from self-report?

- p.14 was unclear what was meant by "attendant" in the sentence with "imprecision of relative risk estimates..." Word can be removed.

**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.

**Declaration of competing interests:**

I declare that I have no competing interests