Reviewer's report

Title: Age at Menarche and Risk of Gestational Diabetes Mellitus: A Population-Based Study in Xiamen, China

Version: 0 Date: 09 Dec 2018

Reviewer: Danielle Schoenaker

Reviewer's report:

This large population-based retrospective cohort study examined the associations of age at menarche with gestational diabetes diagnosis and glucose levels among Chinese women. Findings show earlier age at menarche was associated with higher odds of gestational diabetes after adjustment for maternal age, but this was fully attenuated after further adjustments for pre-pregnancy BMI, blood pressure, education and family history. Later age at menarche was not associated with fasting glucose, but showed lower 1-hour and 2-hour glucose levels in fully adjusted models. The methods used are appropriate, and main study limitations were acknowledge. The manuscript could be improved through more detailed analyses and discussion of the findings.

- The abstract and introduction state that findings on age at menarche and GDM are inconsistent based on previous studies. The meta-analysis by Sun et al (2018) was referenced, but their results should be discussed in more detail as findings show that women with menarche at an early age (≤11 years) had a higher GDM risk with no significant heterogeneity between studies (P = 0.17; I2 = 38).

- A major strength of the study is the large sample size, which would allow detailed subgroup analysis. The authors categorised age at menarche in three categories, and not in line with previous studies for comparison (i.e. most studies define early menarche as ≤11 years). I would suggest a more detailed breakdown of categories of age at menarche, to explore the extremes and shape of the association across categories.

- The order in which covariates were added to the models is not clear. If the hypothesis is that pre-pregnancy BMI is the main factor that would attenuate/mediate the association, than this should be added separately to the last model. Moreover, family history is present prior to childhood and should be included as a confounder in the first model. Although the authors may have a specific rationale for their current models, my suggestion would be to adjust for education level, family history and maternal age at delivery in model 2, add blood pressure in model 3, and add BMI in model 4, to be able to determine the change in odds ratios and influence of these covariates and potential mediators.
- The prevalence of GDM (17.6%) in this population is very high compared with other populations. Please comment on this in the discussion section, and how findings may be applicable to other specific populations.

- While the findings on 1-hour and 2-hour glucose show significant findings in the final models, please discuss the magnitude and potential implications of these associations.

- The conclusion that "early menarche is associated with an increased risk of gestational diabetes may allow clinicians who follow pregnant women to institute early monitoring for signs of GDM, better enabling them to intervene in a timely fashion should this condition arise" is unclear given the study findings. Findings show a weak association with minimal adjustments, and no association after further adjustments. This needs to be reflecting in a concluding statement on the implications of the findings.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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