Reviewer's report

Title: A prospective study of effects of psychological factors and sleep on obstetrical interventions, mode of birth, and neonatal outcomes among low-risk British Columbian women

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Reviewer: Linda Kvist

Reviewer's report:

Thank you for this well-designed and interesting study. The article is long and some parts are rather difficult for the reader to grasp. I strongly suggest that a statistician is asked to review the choice of statistical tests and how they have been used in this paper.

In order to make the article more accessible and readable I suggest some adjustments.

Major essential revisions:

1. Methods: the instruments used are nicely described. There are many variables involved in different analyses and the methods section is 5½ pages long. It could be greatly improved by some re-structuring. Please state what the adverse neonatal outcomes that you measured were, the first time they are mentioned.

There are two main areas of analyses:

1) To test, by use of Chi-square tests, whether proportions of women with epidurals, cesarean sections, assisted vaginal births, and infants with low Apgar scores, low birth weight, low gestational age and admitted to the NICU were affected by mothers’ levels of childbirth fear, anxiety, sleep deprivation and fatigue. Variables which might be confounding factors have been controlled for. These are: maternal age, parity, macrosomia, previous section and available support. The four areas childbirth fear, anxiety, sleep deprivation and fatigue were also controlled for. I think that the use of the word “associations” in this context is misleading. The chi-square test cannot reveal any level of association.

2) To test, by use of logistic regression modelling, whether 9 hypotheses were true. These were:
   a) Women with high levels of childbirth fear are more likely to have an epidural than those with low fear levels. This hypothesis has also been stratified for parity.
   b) Women with high levels of anxiety are more likely to have an epidural than those with low levels of anxiety.
   c) Women with sleep deprivation are more likely to have a c. section than women without sleep deprivation.
   d) Women with high levels of fatigue are more likely to have a c. section than
those with low levels.
e) Women with high levels of childbirth fear are more likely to have an assisted vaginal birth than those with low levels.
f) Women with high levels of anxiety are more likely to have an assisted vaginal birth than those with low levels.
g) Women with high levels of fear of childbirth are more likely to give birth to an infant with one or more adverse outcomes than women with low levels.
h) Women with high levels of anxiety are more likely to give birth to an infant with one or more adverse outcomes.

These two sets of analyses are in fact measuring the same thing but in two different ways. I wonder whether you tested the variables by Chi-square in order to select which variables should be included in the regression analysis but forgot to include this in your description of the method? Please address this problem.

I don’t understand what is meant by the second sentence under “Data analysis” – what is a “statistically significant obstetric intervention”? It is not clear for which analyses you have used odds ratios and relative risk. Please clarify this. (Judging from the “Results” section these were used for the analyses stratified for parity).

There are few adverse neonatal outcomes, which has been pointed out in the manuscript. Please consider that the 4 adverse neonatal outcomes are likely to confound each other – the infants are quite likely to be the same individuals. Consider also what this might mean for the results.

2. Results: It is helpful when using logistic regression models to provide a table of the variables that are selected in the different steps of the model and signify why they were selected. Test statistics (Wald) are usually also provided. If you provide such a table it will not be necessary to repeat all the hypotheses and variables controlled for as is the case at present. It will also explain the selection of variables for the regression model.

3. Discussion: This section would benefit from some development.

The first sentence states that the findings of the present study link high levels of childbirth fear to health issues. Which health issues are being referred to here?

A discussion about possible reasons for increased numbers of premature births in sleep deprived women would enhance the discussion. (Could the women (in part) be sleeping badly because of premature contractions?).

Minor essential revisions:

4. There is a tendency at times for the language to be rather vague. For example: “adverse neonatal outcomes”, many other variables”, “a number of standardized measures” and “other obstetrical interventions”. The reader is left wondering
what the authors mean. Please check through the whole manuscript.

5. Abstract: how were the participants recruited and how many participants were included in the study? Signify also in the results part of the abstract that the increased risks were statistically significant. It would be helpful to state already here which analyses were stratified for parity.

6. Background: The overview of the literature is extensive and international. However, it would give the reader a clearer picture of the state of knowledge if the sections about psychological states in pregnancy and sleep deprivation were a little more succinct. The aim of the study has been placed in the third paragraph of the background at the top of page 12 (although this is not entirely congruent with the aim at the end of the background). Please remove the first version. There is also a sentence about what the findings may be used for which I think belongs in the discussion or conclusion.

7. Methods: Sometimes the expression “maternal characteristics” is used and sometimes “demographic data”. It would be less confusing for the reader if you used the same expression throughout.

8. Not all countries have different NICU levels, please clarify.

9. Discussion: Please develop the statement in the discussion that the fact that high levels of childbirth fear predicted use of epidural can make an important contribution to the literature. In what way can this knowledge be used clinically? Please amalgamate the two sentences about epidural and fear that are presently on page 24 and 25.

10. The limitations of the study have been honestly declared but the reader might benefit from a little more discussion about how some problems could be avoided or what you might have done instead, if you had started over.

11. Conclusion: In the conclusion the reader can read “Our results suggest interventions are necessary for multiparous women to reduce childbirth fear arising from previous birth experiences”. What are your suggestions for interventions? How may these interventions be researched in the future? Can you suggest how the effects of prenatal psychological states and sleep on obstetrical interventions and birth outcomes might be researched and explained?

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**
I declare that I have no competing interests.