Reviewer’s report

Title: The effects of daily meteorological perturbation on pregnancy outcome: Follow-up of a cohort of young women undergoing IVF treatment

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Reviewer: Raymond H.W. Li

Reviewer's report:

This manuscript reported on a retrospective study on the effects of meteorological variation on the pregnancy rate following in vitro fertilisation (IVF) treatment. The objectives and results are clearly presented and reasonably well discussed. The findings are of general interest to clinicians managing couples with infertility.

Special comments:
1. Line 50-51: The authors stated that "assisted reproduction provides a good model for investigating the sole meteorological effects in reproduction as most variables are controlled". In what way are the variables controlled? I think the authors should more precisely say that "… the periconceptional periods and the meteorological variable around those periods were easily and precisely traceable".
2. Line 77: why was ethics approval not required. This study involved analysis on patient data and hence ethics approval should be sought. Did the authors actually mean that "written consents from the subjects" were not required? This may be reasonable for retrospective studies involving only clinical record reviews if this was endorsed by the ethics committee as such.
3. Line 82: On what basis did the authors consider that the effect of meteorological variations can be shown only in patients treated on the long protocol but not the antagonist protocol? The period of ovarian stimulation in women treated on the antagonist protocol is still considerable to allow the effects from meteorological variations to be manifested. In the analysis, the authors were counting in the meteorological parameters during the ovarian stimulation only, and so what happened in the pre-stimulation period were not as relevant anyway. Furthermore, antagonist protocol is a mainstay protocol in recent years and it would be more meaningful to include women treated on the antagonist protocol.
4. Line 88: "Patients with missing/wrong CYCL, OR, ER records or pregnancy outcomes were excluded". Did the authors mean that data on the CYCL, OR and ER dates were missing? I would think that these essential parameters should be reasonably easy to trace back from clinical records (either hard copy or electronic) of patients kept in any ART unit. Also, how would the authors know that some data were "wrong"?
5. It appears to me that some patients were included in this study for more than once. It would be the wrong approach. Only the first treatment cycle of each subject should be included to avoid bias. Otherwise, subjects undergoing repeated treatment (who generally are those with poorer prognosis) would be over-represented.
6. Hence, I think the "intra-patient subgroup analysis" described in lines 209-224 should be
deleted, and it is not the correct approach to perform the analysis.
7. On the other hand, if the authors would like to study the "intra-patient" variations, the repeated measures approach can be used for statistical analyses instead, comparing the first and second cycles (equal number of cycles should be compared within each subject). The absolute change in the meteorological parameters may be correlated with the pregnancy outcome. However, the interval between the two cycles should be adjusted for. A statistician may be consulted for the best approach to perform such analysis.
8. Please describe the luteal phase support protocol in the methodology.
9. Lines 128-130: for the meteorological parameters of each woman, was the mean over the CYCL-OR and OR-ER period being taken for analysis? Please state.
10. Lines 151-152: were the continuous variables normally distributed? If not, they should be presented as median (25th - 75th percentiles), and be compared by non-parametric test (Kruskal-Wallis test) instead of parametric ANOVA.
11. Lines 159-160: please spell ID in full.
12. Lines 169: why were the records missing? Could they be traced from the clinical record (either hardcopy or electronic), which I think all ART units should be keeping.
13. The authors analysed the CYCL-OR and OR-ER periods separately, which makes sense as the former may be more relevant for follicle and oocyte development, which the latter may be more relevant for the uterine environment (since the gametes and embryos were detached from the women during this period), if such effects exist. However, I do not think the CYCL-ER period needs to be reported as it just complicates the picture.

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