Title: Using Bonferroni, BIC and AIC to assess evidence for alternative biological pathways: Covariate selection for the multilevel Embryo-Uterus model.

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Reviewer: Hsin-Chou Yang

Reviewer's report:

Dr. SA Roberts and his collaborators conducted a series of studies on In-vitro Fertilization (IVF) treatments. In this manuscript, the authors made efforts to evaluate suitable statistical procedures for covariate and model selections in Embryo-Uterus (EU) models by simulation studies. They also analyzed a motivating real dataset in the towardSET project. In general, the manuscript is well written. My main concern is the strong assumption, independence among the embryos produced in a single IVF cycle, in the EU model. The authors are suggested to evaluate the impacts of a between-embryo correlation in their simulation study and real data analysis by conducting a sensitivity analysis. Typos, grammar errors, and incompleteness of mathematical notation in the manuscript should be proved carefully.

Level of interest: An article whose findings are important to those with closely related research interests

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