Reviewer's report

Title: Prevalence of birth defects and risk-factor analysis from a population-based study in Inner Mongolia

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Reviewer: A. J. Agopian

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This manuscript describes the prevalence of ten common birth defects in Inner Mongolia, and evaluates the relationship between various demographic and environmental exposures and birth defects (as a single, aggregate outcome, N=976 cases with any birth defect).

Major Compulsory Revisions

1. Because we know that birth defects represent a vastly heterogeneous set of conditions with likely very different etiological mechanisms, it is not meaningful to evaluate the relationship between risk factors and an outcome that lumps all birth defects together. For example, this study included trisomy 21 (i.e., usually due to meiotic chromosome 21 nondisjunction) in the case definition. Typically, etiological studies of birth defects evaluate birth defect phenotypes separately, which is not feasible in this population, given the small numbers of individual birth defects (i.e., N=126 cases with the most frequent birth defect, NTDs). This is a critical weakness, and applies to the majority of the manuscript.

2. To limit heterogeneity, epidemiological studies of birth defect typically restrict their case definition to nonsyndromic cases or isolated cases without additional birth defects. There is no mention of consideration of such an exclusion.

3. More details about the "cluster sampling" approach and case and control ascertainment methods would be helpful to evaluate the potential for bias related to participant selection. Without seeing the breakdown of numbers of cases and controls by risk factors, it is difficult to assess the possibility of bias due to, for example, missing data. The multivariable regression model-building strategy is not clear.

4. Given these concerns (especially #1), I feel that the results are "overly interpreted" in the Discussion section.

Level of interest: An article of limited interest

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

Statistical review: Yes, and I have assessed the statistics in my report.

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