Reviewer's report

Title: Effect of high parity on occurrence of anemia in pregnancy: a cohort study

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Reviewer: Mohammed Mohsin

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Effect of high parity on occurrence of anemia in pregnancy: a cohort study

1. Is the question posed by the authors well defined?
   Yes the question posed by authors at satisfactory level.

2. Are the methods appropriate and well described?
   The methods are not clearly defined (see the specific comments)

3. Are the data sound?
   Quality of the data and representative ness are not mentioned (see specific comments)

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
   The authors need to re-analyse the data (see the specific comments)

5. Are the discussion and conclusions well balanced and adequately supported by the data?
   There are some inconsistencies the re-analysis of the data with more recent references can improve this.

6. Are limitations of the work clearly stated?
   The limitations have been mentioned, generalisability of this data ??

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
   Yes

8. Do the title and abstract accurately convey what has been found?
   Yes

9. Is the writing acceptable?
   Yes, need some editorial work (see the specific comments).

Specific comments

major compulsory revisions

1. The authors used information from 532 parous women recorded in AMAL
study – it was not clear about representative ness of these women as compared to national parous women.

2. The authors mentioned that they used multi-level logistic regression (MLLR) to produce adjusted models. The author did not mention about what levels of multi-level model e.g. 2 or 3 or 4 levels MLLR and also the variables for different levels are not mentioned anywhere. From the results presented in this paper - I assumed the author used simple multiple logistic regression model only. The authors may be ignorantly miss-used the term MLLR throughout the manuscript. The authors need to clear this issue.

3. The authors used ‘RR’ ‘relative risk’ – the logistic regression model produced ‘odds ratios (OR)’. There is a difference between ‘RR’ and ‘OR’. The author needs to replace RR to OR.

4. Table 1: Title the authors need to clear the terms LP and HP by putting <5 and >=5 in brackets after LP (<5) and HP (>=5) respectively. In abstract-methods, the author used HP, >5 pregnancies. It should be >=5. Table 1: due to small sample size can merge 15-19 with 20-24 (15-24) and similarly 35-39, 40-44 in to 35-44 age group which will give better and reliable estimates than the existing categories. Similarly for education the authors can merge 12th grade and higher as one grade. For income merge the last two groups as one group 1000 and above.

5. Table 3 & 4: The results presented in table shows that due to small sample sizes results from Parity 10 to parity 18 shows inconsistent results. My suggestion is to make last category as 8 and higher – that will give more reliable estimates.

6. Table 3 & 4: Column ‘1’ section ‘A’ and ‘B’ is not clear to the reader. Current presentation is confusing it shows all the results are from one model. The authors need to clear that ‘A’ results are from ‘MLR’ where parity used as dichotomous (LP <5, HP>=5). For ‘B’ as I mentioned the last category should be 8 and above. Also the term ‘Para’ does not sound good. The author can used original term e.g. Parity 1, Parity 2-3, so on ‘Parity 8 and above’.

7. Table 3 & 4: How many variables from adjusted groups were significant. The authors did not present any descriptive results of adjusted variables with outcome variables. For any intervention the policy makers needs to identify the characteristics of the high risk group. Since the authors did not present any results from logistic regression analysis – they should include the descriptive statistics especially association of adjusted variables with outcome variables and test the significance at bivariate level. If any variable found insignificant they can drop from multiple logistic regression analysis.

8. Figure 1 & Conclusion: In conclusion, increasing parity appears to increase the risk of occurrence of AIP in a dose response fashion. The figure 1 shows that ORs significantly declined after parity 8-9. As I mentioned previously the author can use parity 8 and above as one category. For this type of small sample size
‘Parity 8 and above’ will give better results.

9. The authors need to revise the whole analysis by re-grouping the variable in a meaningful way. Methods section needs a thorough revision especially ‘multi-level logistic regression (MLLR)’ and other relevant issues.

Minor essential revisions

10. References: The references are up to 2007 only. The authors need to add some recent references from 2008 to 2010.

11. Writing style: The authors need some editorial work in line with academic writing for example in methods section paragraph 5 and 6 most of the sentences started with ‘we’.

We defined an incident case of AIP as an episode of plasma hemoglobin level less than 11.0 g/dl which was first diagnosed in the second trimester or later, from 12 weeks onwards. We chose 11.0 g/dl as the cutoff point in accordance with the WHO recommendations and the local practice in Oman. We specified the 12th week as the onset for the eligible time frame for occurrence of AIP incident cases because it is the beginning of the second trimester during which the pregnancy usually causes the steepest reduction in Hb level [21]. If a case of anemia was diagnosed at booking or during the first trimester, we considered it a prevalent case and the pregnancy was excluded from the study population at risk of developing AIP.

We, first, calculated the cumulative incidence (risk), and the average hemoglobin level of occurrence of AIP for each level of single units of parity. We obtained the crude and adjusted measures of the effect of parity on the occurrence of AIP by using multi-level logistic regression (MLLR) analysis [22]. We chose MLLR for analysis because it accounts for the dependency that exists among pregnancies that belong to the same woman.

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

**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’