Reviewer’s report

Title: Novel approaches to estimating abortion incidence

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Reviewer: Gilda Piaggio

Reviewer’s report:

General comment

The paper is well written and the need of reliable estimates of abortion incidence is well justified.

However, I have the following major comments:

1) the substantial part of the paper is a review of existing methods (section 'ABORTION ESTIMATION METHODOLOGIES'). Given that the title of the paper refers to novel approaches, a special section is needed describing the novel approaches. The novel approaches are interspersed with the existing approaches in the review section. As I could understand, the first mentioned novel approach is the modified AICM (subsection 'Modified AICM'), in which 'the number of abortions not receiving PAC for every abortion receiving such care would be obtained from women's self-reported abortions instead of from knowledgeable informants'. The second mentioned novel approach is the Confidante Approach, but it is not clear whether this is an existing method that the authors are modifying or it is an entirely new method proposed by the authors (in the Plain English summary it seems this is the case, but in the text it is not clear).

2) Statistical comments 1: There are two important issues involved in the estimate of abortion incidence: bias and precision. Some reference is made to bias, when it is stated that all available methods tend to underestimate the abortion incidence. It is not explained why the novel approaches are less prone to bias, are they? And are the novel approaches more precise? These issues should be addressed.

3) Statistical comments 2: in the description of abortion estimation methodologies there is no mention to statistical methods. A full description would include all the following:

a. sampling frame: for example, all the women in reproductive age in a certain geographical area;

b. sampling design: for example, a two-stage sample of households (first stage) and of women (second stage) in a certain geographical area;

c. methods to collect information: for example, direct questioning is one of these;
d. estimates of abortion incidence and confidence intervals. More development is needed on how the estimates are calculated and what are the estimates of the standard errors, as these estimates would be used to compute the confidence intervals.

Note that in your description the items above are not distinguished. For example, in the AICM method (page 6), the sampling frame for the first survey would presumably be all health facilities in the particular country, and the method of collecting the information would be, I assume, to examine the registries in each sampled health facility?

4) In the abstract we learn that the authors discuss three approaches to estimate abortion incidence: the List Experiment, the Confidante Approach, and a modification of the Abortion Incidence Complications Method (AICM). Then we read that authors also discuss two prevailing approaches to the field: direct questioning of women about their abortions, and the AICM. There is a confusion here regarding which are the approaches to be discussed: the set of three or the set of two? In the body of the paper, under 'ABORTION ESTIMATION METHODOLOGIES', authors discuss five methodologies: Direct questioning, The Abortion Incidence…. (AICM), Modified AICM, List Experiment, Confidante Approach. Please see that there is consistency between the abstract and the main text, and between the different statements about which methodologies are discussed.

5) The section 'DETERMINING THE BEST APPROACHES FOR ESTIMATING ABORTION INCIDENCE' can be improved with actual comparisons. Simply describing the possible techniques does not inform about which are the best approaches. For the first strategy proposed, 'Comparing the level of underreporting across methods', I do not see any serious justification 'to deem the highest estimated abortion rate from these approaches to be the least biased estimate'. In reference 17, the actual vote count was available. It is a difficult issue, as in the case of abortion incidence there is no gold standard. Perhaps simulations can be done.

6) The section 'Conclusions' contains a discussion rather than conclusions.

Specific comments

1) Abstract, METHODS and RESULTS: Please use the same order when you list /describe the methods. In METHODS, the order is List Experiment, the Confidante Approach, AICM. In RESULTS, the order is changed and direct questioning (one of the 'prevailing approaches') is added at the beginning.

2) Page 4, lines 6-7: women in reproductive age? Perhaps add more details (number of countries, number of women…)

3) Page 3, line 20 and page 4, lines 40-43: the multiplier is defined in different ways. I find the first definition clearer (the one in Plain English summary).
4) Page 6, lines 53-55, 'it is assumed that the proportion of miscarriages treated in facilities is similar to the proportion of live births delivered in facilities': I do not understand this similarity. Please explain or correct.

5) Page 10, line 25: four strategies are described, not three.

6) Page 14, APPENDIX: I do not see the need of including these definitions, it is sufficient to cite the reference 3 under Background (page 4, lines 31-33).

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