Author’s response to reviews

Title: Novel approaches to estimating abortion incidence

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Reviewer reports:

Reviewer #1: Bravo to Sedgh and Keogh for starting this review. It's been 15 years since Rossier (2003) published her review of methods for measuring induced abortion, and as Sedgh and Keogh state, multiple new approaches have been developed, explored and tested since then. Sedgh and Keogh discuss three approaches (five methodologies) for abortion estimation, presenting assumptions, strengths and weaknesses of each, and validation strategies.

The effort is timely and has promise, but as the field is ripe to benefit from a more rigorous analysis, their review should go beyond the format of a discussion and presentation. Sedgh and Keogh’s description of methods should include more detail to describe how the estimation methodologies reviewed were selected for inclusion, and which ones were considered and excluded, and what set of inclusion and exclusion criteria was used.

RESPONSE: Thank you, we have added more detail on all the approaches we considered. We also further elaborated on the inclusion and exclusion criteria we used to select them for the review in the last paragraph of the background section.

Sedgh and Keogh consider the strengths and weaknesses of each of the 5 included methodologies. The authors present relevant and thoughtful information. As a reader I am interested in seeing what a more structured and detailed presentation and analysis would yield. What could be gained from systematically including in table format the multiple strengths and weaknesses of each approach used for abortion estimation? Would additional analyses that could push the field forward present themselves? The discussion and conclusions resulting from a more systematic and detailed analysis may differ from those presented in the current manuscript.

RESPONSE: We have added a table that presents some of the strengths, weaknesses and key features of the methods reviewed. We agree this structured format will help readers assess and compare some of the topline points about the methods. We considered revising the discussion and conclusions on the basis of this more systematic presentation of the methods, but this ended up being repetitive.
We are not sure if the reviewer is suggesting that we conduct analyses to help move the field forward. This paper focuses on reviewing and discussing methodological issues rather than presenting analyses; as such, we do not present analysis; moreover, quantitative findings are not yet available for the two novel methods proposed here. It is our hope that this paper will motivate research and analyses using these methods.

The conclusion recommends use of multiple methods, or triangulation, to increase the validity of abortion estimation in the absence of a gold standard. Triangulation in the field of abortion estimation is worthwhile, but not new. A systematic presentation of abortion estimates for the same populations and time periods but using different estimation methodologies could support the development of additional insights about the different abortion estimation techniques examined.

RESPONSE: We agree, and we are not putting triangulation forth as one of the novelties. This is already noted this in conclusion/discussion, and we have revised the abstract to make sure it is clear there, as well. We have also added text in the discussion explaining that these methods are currently being tested in a few countries, and that a comparison of abortion estimates from the same population can help us glean further insights into how the method work, and possibly how they might be improved.

Before publication I recommend the authors detail the methods that are used for inclusion and exclusion of the different estimation methodologies. I further recommend using a more detailed and systematic approach to analyzing the included methodologies. An analysis of use of triangulation for abortion estimation could yield further insights. In the end, I think this restructured analysis could be an exciting contribution to the field.

RESPONSE: See above.

Reviewer #2: 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).

RESPONSE: We tried to reorder the methods in the review section so that the novel methods were separate from the other methods, but it was problematic. We present the methods in the current sequence because of the ways that they build on and relate to one another. But we have added text to further clarify which methods are being put forth as new innovations and which are not. The Confidante Approach is neither entirely new nor a simple modification of an existing method. It draws from various existing methodologies to generate an approach that has not, to our knowledge, been used before. We made a few revisions in the text to make this clearer. We also elaborate here on one of the newer innovations of this method, namely the application of a visibility factor to account for confidante’s abortions not known to the respondents.

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.

RESPONSE: We have added a table (Table 1) in response to reviewer #1 that should make this clearer.

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?
RESPONSE: Thanks for this example. We have provided more detail about the statistical methods for each approach described. Specifically, we included the sampling frame, sampling design, data collection methods, and formulas to calculate the abortion incidence estimate (for the List Experiment, this was already included). We did not include how to calculate the standard errors, as this is more appropriate for a paper in a statistical journal, and in the case of the AICM and modified AICM, standard errors are complex as they involve combining two survey estimates.

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.

RESPONSE: Thank you, we have clarified in the abstract and the main text that we are reviewing five approaches: three existing approaches and two novel ones.

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.

RESPONSE: We added a citation to prior work that demonstrated that, in all validation studies available, abortion was notoriously underreported in surveys. We also changed the language to say that “it might be reasonable to deem the highest estimated abortion rate from these approaches to be the least biased estimate.” The paper does not present findings from analyses, rather it provides a review of conceptual, methodological issues. It is beyond the scope of this article to conduct simulations.

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

RESPONSE: We agree, and we have relabeled this a Discussion” section, pending approval from the editors.
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.

RESPONSE: We have reordered all sections so that they are in the same order: direct questioning, AICM, List Experiment, Confidante, modified AICM.

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

RESPONSE: Thank you, we have clarified this and added the number of countries.

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).

RESPONSE: We have modified the definition in the background to match that in the 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.

RESPONSE: We have reworded the sentence to clarify that it is an assumption of the AICM – not our assumption.

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

RESPONSE: We have corrected it to four.

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).

RESPONSE: While some readers may be familiar with these approaches, others may benefit from a summary of each without having to consult the original references. We therefore think these should be retained. We think that the appendix is a good place to offer this without distracting readers from the main points of the paper.