Reviewer’s report

Title: The characteristics of mixing patterns of sexual dyads and factors correlated with condomless anal intercourse among men who have sex with men in Guangzhou, China

Version: 2 Date: 25 Mar 2019

Reviewer: Oliver Stirrup

Reviewer's report:

Response to Reviewer 3

R1 comment: "the newly diagnosed HIV infection rate among MSM increased from 0.9% in 2003 to 7.75% in 2014" - from the text alone it is not clear what these numbers represent, but it reads as if this could be the annual incidence of new diagnoses. Checking the reference Abstract shows that the numbers given are actually for HIV prevalence (the word 'rate' should not be used).

1. Introduction section, line 52-53, page 3: "the newly diagnosed HIV infection rate among MSM increased from 0.9% in 2003 to 7.75% in 2014" has been revised as "the HIV prevalence over the years among MSM increased from 0.9% in 2003 to 7.75% in 2014";

R2 comment: Now OK.
R1 comment: "The HIV incidence rate among MSM in Guangzhou has significantly increased from 5.0% (19/379) in 2008 to 11.4% (72/633) in 2013". Again, this is the HIV prevalence, not 'HIV incidence rate'.

2. Method section, line 104, page 6: "incidence rate" has been changed as "prevalence";

R2 comment: Now OK.
R1 comment: "Participants stated whether they had had condomless insertive anal intercourse without using HIV-PrEP (Pre-Exposure Prophylaxis) with sexual partners in the past 12 months." Do you have any data on PrEP use?

3. Method section, PrEP using is not available through any legal way in Guangzhou during our investigation, so we did not collection the information about PrEP using;

R2 comment: This should be stated in the manuscript.
R1 comment: "We used robust generalized estimating equations (GEE) to analyze the relative CAI risk factors in this paper using correlated dyadic data clustered among the respondents". GEEs are always used alongside a generalised linear model, and the details of this should be stated as well. I assume from your results that the model used was logistic regression (i.e. from the fact that you report odds ratios), please specify throughout.
4. Method section, Table 4, page 16: We have adjusted our results on the table 4, we used code of PROC GENMOD to analysis data, and the ID number of participants as repeated subject to account for the correlation clusters, we calculated the AORs from the value of estimate; in this study, the information of the sexual partners nominated by the same participant are clustered, but the information was collected at one time point rather than multiple time points, so we did not use Generalized Linear Model to analyze the data.

R2 comment: If you read the first line of the SAS PROC GENMOD user guide you will see that "The GENMOD procedure fits generalized linear models..." ([https://support.sas.com/documentation/cdl/en/statug/63033/HTML/default/viewer.htm#statug_genmod_sect001.htm](https://support.sas.com/documentation/cdl/en/statug/63033/HTML/default/viewer.htm#statug_genmod_sect001.htm)). The statistical analysis in the manuscript at present is not fully described and my previous points still stand.

R1 comment: I do not understand the percentages presented in Table 2, please specify exactly the numerator and the denominator for each value given. It may be helpful to give summary statements for one or two examples in the text to make it easier for the reader to follow.

5. Results section, line 219-220, page 12, we have added an example in the text to help understanding the percentages presented in Table 2, additionally, we have added footnotes at the bottom of Table 2 to illustrate the percentage and the define of UCAI;

R2 comment: I do not think that the way in which the percentages have been defined here is the best way of presenting the data (although I do at least now understand what has been done). The percentages are the proportion of CAI and non-CAI linked partners divided up according to the characteristics of the participants in the study. However, this does not provide any information regarding the CAI vs non-CAI proportion within each category. I would prefer to see a summary of 'at least one CAI or non-CAI partner' for each demographic category on a 'per participant' basis. If not, please at least also provide n values (i.e. as in the supplementary file).

R1 comment: UCAI is not defined in Table 2.

6. Results section, Table 2, line 477, page 27, we have added footnotes at the bottom of Table 2 to illustrate the define of UCAI;

R2 comment: I am still not sure what the 'U' stands for. I think that it would be better to match the text and use 'non-CAI'.

R1 comment: For the GEE analyses (i.e. the results in Tables 3 and 4), were all factor analysed together within a single model, or was each factor evaluated separately? This is not clear at present.

7. Results section, for Table 3, we used age, education and marital status of participants and respondents separately; for Table 4, we used multiple variable analyses, except of the variable list on the table 4, we have adjusted age, education and marital status of participants and their partners;

R2 comment: This information should be stated explicitly in both the text and the table captions.

R1 comment: The term 'relative risk' should not be used when describing odds ratios.

8. Results section, Table 3, page 14, we have changed 'relative risk' as "odds ratio";
R2 comment: The term 'relative risk' is still used in the Abstract and the Discussion.
R1 comment: Please add confidence intervals to the results in Table 3.

9. Results section, Table 3, page 14, we have added the confidence intervals to the results in Table 3;

R2 comment: Confidence intervals should be added for all OR reported, not just those deemed statistically significant.
R1 comment: You do not report how the probability of CAI varies according to respondent characteristics, did you look at this?

10. Results section: dear reviewer, many thanks for your reminding, we did not report how the probability of CAI varies according to respondent characteristics, the reason is: the aim of this study is to explore the characteristics of mixing patterns of sexual dyads and factors correlated with CAI among MSM, most previous studies have focused on the demographic characteristics of sexual partners and their relationship to CAI among MSM; however, the CAI risk factors are multidimensional, these studies did not present the social communication characteristics and their relationship to CAI. As you said, the respondent characteristics could be important associated with CAI, so in our analyses model, we have put these factors into the model to adjust (Table 4).

R2 comment: I would still prefer to see this issue addressed directly, but the relative occurrence of CAI within each category can at least now be gauged from the n values in the supplementary Table (which I would prefer to see in the main text).

11. Results section, line 258, and Table 4, page 15-16, we have changed "Ways of making friends" as "Method of meeting sexual partners";

R2 comment: The phrase "method of making friends" is still in the text of the Methods section.
R1 comment: The sample size of older men (≥41) is smaller, and so lack of statistical significance for comparisons could just be due to lack of power. This should be mentioned as a limitation.

12. Discussion section, line 341-342, page 19, we have added the third limitation as "the sample size of older men (≥41) is smaller, and so lack of statistical significance for comparisons could just be due to lack of power";

R2 comment: Now OK.
R1 comment: "Ethics approval and consent to participate", this information is given within the main text and should be included here.

13. Declarations section, line 354-361, page 20-21, we have rearranged the part of Ethics approval and consent to participate to the declarations section.

R2 comment: Now OK.
R1 comment: "Availability of data and materials", the authors do not seem to have provided the raw data for their analyses. I am not sure of the journal's policy on this.
14. All data generated or analyzed during this study are included in this published article and its supplementary information files.

R2 comment: The authors have provided some more data, but not their full raw dataset.

**Are the methods appropriate and well described?**

If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**

If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**

If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?** If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

**Quality of written English**

Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

**Declaration of competing interests**

Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?
6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal