Reviewer’s report

Title: Inequities in consistent condom use among sexually experienced undergraduates in mainland China: implications for planning interventions

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Reviewer: David Moore

Reviewer’s report:

This is a potentially interesting article on condom use among undergraduate medical students in China. Its main novelty is in the application of Anderson's belief model to the outcome of consistent condom use. However, the rationale for focusing on undergraduate university students is not well described. As well there are many statements throughout the paper which are not referenced or are referenced with citations which do not support the statement. The selection process for the final set of variables to be included in the multivariate model is not described. The most important conclusions - that those who may have some risk of acquiring HIV are less likely to use condoms is somewhat lost in the discussion. I believe that all of these issues can be corrected, but will require a major revision.

Introduction: The first sentence suggests that it has been shown that changes in sexual behaviour have led increasing number of HIV diagnoses. However, the reference only reports on a cross-sectional survey taken at one time-point of behaviour and provides no data on associations with HIV. This statement is not supported by the reference.

It is stated that "The predominant mode of HIV transmission among Chinese young students is through sexual intercourse, especially through male-to-male sexual contact.". However, the reference again only reports on a survey of sexual behaviour and not on HIV diagnoses. Please provide data on modes of transmission from surveillance data and provide references.

Please provide some supporting information and references for the "rapid spread of HIV and other STDs among unmarried sexually active college students in China…"

The justification for this study is very weak: "The present study aimed to expand on previous research by employing hierarchical logistic regression models. to compare relative influences of various determinants on consistent condom use.." It does not appear to provide much in addition to what the authors have reviewed as our previous research on the subject. Did they really think that there would be no inequities in CCU that they would uncover in this study? This justification can be deleted.

A better rationale for the study is in applying the behavioural model which they describe to this issue. However, again it is unclear if the factors they are studying are truly novel in this context, or if they are just applying them to the model.
The sections describing the ABM can be shortened substantially. Similarly the paragraph on hypotheses could like be shortened to a sentence. Some of how they apply the framework to the variables they examine should be included in the methods.

Methods: Why was the sample limited to undergraduate university students? The rationale for this should be explained in the introduction.

The convenience and snowball sampling methods described can never be expected to produce a "nationally representative sample of college student in mainland China". Only a form of random sampling can do this. The goal would be better described as to get a more geographically diverse sample, than just from HUST students.

Were the promotional materials on Wechat, Sina Weibo, and QQ space targeted specifically to university students or directed generally to all users?

The sentence "From the perspective of HIV prevention and intervention, HIV can be acquired and transmitted through only one act of unprotected sexual intercourse" should be deleted. While in theory this is true, the reality is that the probability of transmission with a single act is extremely low. Again the reference does not support this statement.

The statements: "Multiple and casual sexual partners have long been recognized as risk factors for HIV infection' Has this been demonstrated among heterosexuals in China?

"Age at first sexual debut is also included in this study because early initiation of sexual activity has been escalating among young students" If this is true, please provide a reference. The reference at the end of the sentence only refers to the association with age of sexual debut and multiple sexual partners.

Dichotomizing the s, self-perception of HIV risk into "no risk" and "high risk" makes no sense, particularly for such a large sample size and particularly for a predominantly heterosexual sample. Many of those in the high risk category - including those who report not sure, low or moderate risk likely have accurate perceptions of having low risk.

Are the values reported adjusted odds ratios or univariable odds ratios. If it is the former, then they should be listed as AORs.

Need to describe what the 3 models presented in the results refer to.

Also, it appears that all variables with a p value <0.05 were included in the models. Did you not use some kind of model fit criteria for variable inclusion?

The model selection process is somewhat described in the results. It should be described in the methods.
Results/tables:

As one of your goals was to have broad geographic representation in your sample, please include province or state of residence in Table 1.

Given that the introduction describes that 80% of new HIV infections are among MSM, the non-heterosexual categories, should be further broken down into men and women.

It would appear that Model 3 is your final adjusted model. If so, please only describe your results in terms of what you found in this model. Also please state if including all variables listed here produced the best model fit. Usually some variables drop out of models will building the final multivariate model. Again, you should use the term adjusted odds ratio (AOR) for multivariate models., rather than ORs.

You do not need to report p values in the text, if you are also reporting 95% confidence intervals.

Discussion:

In the first paragraph the authors refer to a "the rising HIV epidemic among sexually experienced college students in mainland China". However the evidence for this is not provided in the introduction nor in this paragraph.

The comparison with previous studies should not be the primary focus of the discussion, as most of these surveys are done through convenience samples, limiting the generalizability of all of them. What is more interesting and should be discussed in more detail is that those individuals with clear risk factors for HIV (non-heterosexual, multiple sexual partners; self-perceived high risk of HIV) are less likely to have CCU.

Given that the introduction describes that 80% of new HIV infections are among MSM, the non-heterosexual categories, should be further broken down into men and women.

The implications of the study should be focused on what you have learned based on this analysis. That CCU is not distributed equally is not new.

The 100% condom-use program assumes that all people are at equal risk of acquiring HIV, but we know this is not true. Most of the new diagnoses are among MSM, so it would seem that targeting services for MSM would have more impact than targeting the general population. You mention that services should be targeted. Can you describe how this can be done? Are there examples in China or can you borrow from elsewhere?

The concluding paragraph could be deleted. Most of the points are already covered in the "Implications" section.

Minor revisions:
Background: "Although the growth rate saw a downward trend in 2016…"  This sentence needs to be rewritten. If the number of diagnoses declined please state so clearly.

**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?**
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