

PEER REVIEW HISTORY

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ARTICLE DETAILS

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| TITLE (PROVISIONAL) | HIV Knowledge, Sexual Practices, Condom Use and Its Associated Factors Among International Students in One Province of China: a cross-sectional study |
| AUTHORS | Zhou, Qidi; Wu, Weizi; Yi, Mengyao; Shen, Yan; Goldsamt, Lloyd; Alkhatib, Asem; Jiang, Wenjing; Li, Xianhong |

VERSION 1 – REVIEW

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| REVIEWER | Chunyan Li University of North Carolina at Chapel Hill, Health Behavior |
| REVIEW RETURNED | 07-Nov-2021 |

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| GENERAL COMMENTS | <p>Abstract</p> <ol style="list-style-type: none"> Line 25: involved in □ were included in this study. Results: <ol style="list-style-type: none"> Add the absolute number of participants after each % in brackets. How was "have sex" defined? Oral, anal, vaginal, or other non-insertive sex behaviors? Line 43: training in China □ training "while studying" in China <p>Article summary:</p> <ol style="list-style-type: none"> Overall comment: Please rephrase the summary sentences to make sure they are grammatically correct and succinct. Missing period at the end of the last two sentences. <p>Introduction:</p> <ol style="list-style-type: none"> Overall: I would suggest using "international students" rather than "overseas students" throughout the manuscript. Line 12: I would rephrase the first sentence as "China has become one of the main host countries for international students studying in Asia" I would suggest deleting the statements between line 20-line 30, "which have a comparatively (...) 63.9% respectively", as they read less relevant to your argument. The 2nd paragraph could be improved if the authors provide more in-depth reasoning behind why international migrants are more likely to have higher health risks (e.g., structural, social, and individual factors), rather than presenting a simple summary of findings from previous studies. I think the introduction section needs to be restructured as the current version is more like a simple compiling of literature. It may be difficult for readers to see the authors' main argument or the significance of the study. The main purpose of the introduction section is to define the knowledge gap using the most important/key evidence, and argue that how this study is going to address the gap. Whenever a previous study is cited, always link it back to the current study, so that the readers will be able to know what the new knowledge this paper is going to add. |
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| | <p>Methods:</p> <p>11. Study setting: It would be nice if the authors could provide more contextual information about the study site since the name was not disclosed. E.g., population size, and overall HIV prevalence rate, if that's relevant.</p> <p>12. How was "growing up in China" defined? For example, If someone came to China in their 10s-20s, would they be counted as "growing up in China"? How were these criteria assessed during the study implementation process?</p> <p>13. How did the study team approach the 10 universities? Did the authors sample out the 10 universities first, and approach them individually? How would you make sure no students outside of the 10 universities answered the survey? What screening questions were used in the survey for verification? Also, it seems the authors had a list of universities and the # of enrolled international students in that province, what was the rationale for the study team to only include the first 10 universities instead of all of them?</p> <p>14. Measurements: Alternatively, the authors could consider making a table of measurements, including definitions, scales, and references.</p> <p>15. As commercial sex is defined as "paying for sex", did it also include "getting paid for sex"? or in other words, transactional sex?</p> <p>16. Survey validity and reliability: Could the authors provide more details regarding how they calculated the two indicators? What measures and sample(s) were used?</p> <p>Results:</p> <p>17. Line 33: add standard deviation of age.</p> <p>18. Page 14, Line 48: Does the "overseas study period" mean their study time in China, or their home country, or in places outside of China, or in places outside of their home country? Please provide a clear definition at the beginning, and keep the phrase consistently used throughout the manuscript.</p> <p>19. Page 14-15: the authors' statements of "196 reported having sex during the overseas study period" on page 14 and "among the 196 students who reported engaging in sexual behaviors" seemed confusing. Did you mean there were 196 out of 607 students who reported having had sex while "studying in China" (see my comment above)? I think the authors may need to be careful with their defined measures when presenting the data.</p> <p>20. Decimal digits of numbers: Please keep the decimal digits of numbers consistent throughout the manuscript.</p> <p>21. HIV/STI-related variables: this may be beyond the survey scope, but I am curious if the international students received HIV/sex education in Chinese or English. What were the main contents of such education? How did they get HIV tested (e.g., self-test or in-clinic test?)</p> <p>Discussion:</p> <p>22. Overall: What were some possible explanations for international students to engage in more sex and even unprotected sex? Beyond individual characteristics and cultural differences, what about the local environment settings, accessibility to health resources, social support system, etc? How did these factors work together and change individual's behaviors? The 3rd – 4th paragraphs (starting with "the rates of unprotected sex") seemed touching a little bit on the surface, but it did not go deep enough. Similar to what I have commented on in the introduction section, readers are expecting to see more synthesized statements of our current knowledge and the authors' reasoning process in the manuscript, instead of a list of publications.</p> <p>23. The discussion on female international students' less</p> |
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| | condom usage should be focused on the gender power imbalance in sex negotiation and women's limited access to & utilization of reproductive health care and services in low- and middle-income countries, and most importantly, the reasons behind it. |
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| REVIEWER | Yong Cai Shanghai Jiaotong University, School of Public Health |
| REVIEW RETURNED | 24-Jan-2022 |

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| GENERAL COMMENTS | <p>1. Update the total number of international students in China and Hunan Province.</p> <p>2. School distribution of the 607 participants and the 196 international students who had sexuality should be reported.</p> <p>3. The title of the article may need to be reconsidered. The non-probability sampling method and the sample of only 196 international students who had sexuality while studying in China are hardly representative of the international students who had sexuality in Hunan province.</p> <p>4. page 13, line 35 mentions that there are changes to the original questionnaire. 'a 22-item questionnaire was developed based on a previous questionnaire exploring sexual behaviors among Chinese men who have sex with men (MSM) 23'. How does it differ from the original questionnaire? Will these differences affect the reliability and validity of the questionnaire?</p> <p>5. Page 20, line 56 is an incomplete sentence?</p> |
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VERSION 1 – AUTHOR RESPONSE

| Response to Reviewer #1: | |
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| Comments | Answers |
| Abstract 1. Line 25: involved in were included in this study | Thank you for your suggestion. We corrected the error. |
| 2. (1) Add the absolute number of participants after each % in brackets. (2) How was "have sex" defined? Oral, anal, vaginal, or other non-insertive sex behaviors? | Thanks! (1) We added the absolute number of participants after each % in brackets. (2) "Have sex" was defined as penetrative sex including oral, vaginal and anal sex. We added that "having penetrative sex including oral, vaginal and anal sex" (page 1, line 17) |
| 3. Line 43: training in China training "while studying" in China | Thanks! We have corrected the error. |
| 4. Overall comment: Please rephrase the summary sentences to make sure they are grammatically correct and succinct. | The summary sentences have been revised thoroughly, and one of our co-authors is a native English speaker, who has helped to revise the summary sentences to make sure there were no grammar errors. |

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| 5. Missing period at the end of the last two sentences. | Thanks. The period has been added. |
| Introduction: 6. Overall: I would suggest using “international students” rather than “overseas students” → throughout the manuscript. | Thanks. We have replaced all “overseas students” with “international students”. |
| 7. Line 12: I would rephrase the first sentence as “China has become one of the main host countries for international students studying in Asia” | Thanks! We accepted this suggestion and made the suggested change. |
| 8. I would suggest deleting the statements between line 20-line → | Thanks. We have deleted these sentences. |

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| <p>30, “which have a comparatively (...) 63.9% respectively”, as they read less relevant to your argument.</p> | |
| <p>9. The 2nd paragraph could be improved if the authors provide more in-depth reasoning behind why international migrants are more likely to have higher health risks (e.g., structural, social, and individual factors), rather than presenting a simple summary of findings from previous studies.</p> | <p>Thanks, we have provided more in-depth reasoning behind why international migrants are more likely to have higher HIV/STI risks from the perspective of individual-, interpersonal- and social-cultural perspectives.</p> |
| <p>10. I think the introduction section needs to be restructured as the current version is more like a simple compiling of literature. It may be difficult for readers to see the authors' main argument or the significance of the study. The main purpose of the introduction section is to define the knowledge gap using the most important/key evidence, and argue that how this study is going to address the gap. Whenever a previous study is cited, always link it back to the current study, so that the readers will be able to know what the new knowledge this paper is going to add.</p> | <p>Thanks. The introduction section has been restructured with more justifications and elaborations on: “why the international students' sexual behavior was a concern”, and through the discussion, we pointed out the research gaps and then put forward our research aims.</p> |

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| <p>Methods:</p> <p>11. Study setting: It would be nice if the authors could provide more contextual information about the study sites since the name was not disclosed. E.g., population size, and overall HIV prevalence rate, if that's relevant.</p> | <p>We reported the overall population size and HIV prevalence in the province . We added that “<i>This study was conducted in a south central province of China, which has 66.5 million people</i>”¹⁹. There were 43,133 cumulative HIV diagnosed cases by the end of 2020, and 93.8% were infected through sexual contact; the HIV prevalence among young people in this province is increasing.” (page 5, line 19-21)</p> |
| <p>12. How was “growing up in China” defined? For example, If someone came to China in their 10s-20s, would they be counted as “growing up in China”? How were these criteria assessed during the study implementation process?</p> | <p>Thanks. “Growing up in China” in this study means they were living in China before entering college. This has been added in the inclusion criteria section and highlighted. Because if they were living in China before college, they were assumed to be familiar with Chinese culture which might be a confounder.</p> |
| <p>13. How did the study team approach the 10 universities? Did the authors sample out the 10 universities first, and approach them individually? How would you make sure no students outside of the 10 universities answered the survey? What screening questions were used in the survey for verification? Also, it seems the authors had a list of universities and the of enrolled international students in that province, what was the rationale for the study team to only include the first 10 universities instead of all of</p> | <p>Thanks for your comments. We initially selected the 10 universities based on the statistical data that the top 10 universities in the province hosted over 90% of international students. This information has been added in the line 2-5, on page 6, which have been highlighted.</p> <p>An item had been designed that “which university are you studying in”, if the participant selected “others” rather than the 10 universities, they were excluded.</p> <p>The detailed procedure about how to approach to those participants in these universities was described in the “Data collection procedure” on page 6-7.</p> |

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| them? | |
| 14. Measurements: Alternatively, the authors could consider making a table of measurements, including definitions, scales, and references. | Thanks for your advice, however, we reviewed the published articles on BMJ Open, and did not find any article presenting the measurements in tables. BMJ Open requires no more than 5 tables, thus we thought we could also elaborate them in text but with more details and references. |
| 15. As commercial sex is defined as “paying for sex”, did it also include “getting paid for sex”? or in other words, transactional sex? | Thanks. We defined the word “commercial sex” as “paying for sex or getting paid for sex”. |
| 16. Survey validity and reliability: Could the authors provide more details regarding how they calculated the two indicators? What measures and sample(s) were used? | Thank you for your suggestion. We supplemented the details about the survey validity and reliability. We added “ <i>The content validity of this new instrument was (content validity index) 0.92, which was calculated by inviting 5 experts for evaluation.</i> ” (page 7, line 18-21) |
| Results: 17. Line 33: add standard deviation of age. | Thanks! We added standard deviation of age on page 9, line 19. |
| 18. Page 14, Line 48: Does the “overseas study period” mean their study time in China, or their home country, or in places outside of China, or in places outside of their home country? Please provide a clear definition at the beginning, and keep the phrase consistently used throughout the manuscript. | Thanks for your comment. We changed the “overseas study period” to “while studying in China”, and made it consistent throughout the manuscript. |
| 19. Page 14-15: the authors’ statements of “196 reported having sex during the overseas | Thanks for your comment, and this has been revised. We changed the “overseas study period” into “while studying in China”, and made it consistent throughout the manuscript. We hope this more clearly indicates |

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| <p>study period” on page 14 and “among the 196 students who reported engaging in sexual behaviors” seemed confusing. Did you mean there were 196 out of 607 students who reported having had sex while “studying in China” (seemy comment above)? I think the authors may need to be careful with their defined measures when presenting the data.</p> | <p>that 196 of the students reported having sex during the period they were studying in China.</p> |
| <p>20. Decimal digits of numbers: Please keep the decimal digits of numbers consistent throughout the manuscript.</p> | <p>Thanks. We kept the decimal digits to 2 consistently in the main text.</p> |
| <p>21. HIV/STI-related variables: this may be beyond the survey scope, but I am curious if the international students received HIV/sex education in Chinese or English. What were the main contents of such education? How did they get HIV tested (e.g., self-test or in-clinic test?)</p> | <p>Thanks for your comment. “HIV/STI-related variables” mainly included whether they received HIV/STI health services, for example, whether they took HIV/STI tests, whether receiving HIV/STI related education while studying in China. We did not specify what kinds of testing approaches they took, or what formats of education they received.</p> <p>As for the content of education, it could be lectures or brochures provided by universities, which were widely and typically provided every year to Chinese students by universities, but we are not sure whether these services were provided to international students. That is the reason why we conducted this investigation. The result will provide evidence for policy makers and educators in universities to provide those services to international students if they have not previously done so.</p> <p>We added more details in the “Measurements” section on page 8, line 11-14 as below: <i>“Data on HIV testing experience (either having a test at VCT centers or hospitals, or at home by using</i></p> |

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| | <i>self-test kits), STI infection experience, and having received any kinds of HIV/STI related education (lectures, brochures, et al.) in China were also collected".</i> |
| <p>Discussion:</p> <p>22. Overall: What were some possible explanations for international students to engage in more sex and even unprotected sex? Beyond individual characteristics and cultural differences, what about the local environment settings, accessibility to health resources, social support system, etc? How did these factors work together and change individual's behaviors? The 3rd – 4th paragraphs (starting with "the rates of unprotected sex") seemed touching a little bit on the surface, but it did not go deep enough. Similar to what I have commented on in the introduction section, readers are expecting to see more synthesized statements of our current knowledge and the authors' reasoning process in the manuscript, instead of a list of publications.</p> | <p>Thank you for your advice. We added further discussion on why international students tend to engage in more sex and more unprotected sex.</p> <p>We also discussed the influence of the local environment, although we thought it did not have much impact on the sexual behaviors of the international students because the study setting of the province is a moderate economic province with traditional conservative attitudes towards sex and an average level HIV prevalence in China. It is not like the metropolitan city where there is a relatively open attitude towards sex. Those discussions were highlighted on page 13-15.</p> |
| 23. The discussion on female international students' less | Thank you for your suggestion. We added discussion about the lower rate of condom use among |

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| condom usage should be focused on the gender power imbalance in sex negotiation and women's limited access to & utilization of reproductive health care and services in low-and middle-income countries, and most importantly, the reasons behind it. | international female students from the perspective of gender inequity, which were highlighted on page 15-16. |
| Response to Reviewer #2: | |
| 1. Update the total number of international students in China and Hunan Province. | Thank you for your suggestion. We prefer to use the number of the international students in 2018 and 2019, since this study were conducted in 2019. As we know that the total number of the international students reduced a lot since 2020 due to the COVID-19 pandemic. |
| 2. School distribution of the 607 participants and the 196 international students who had sexuality should be reported. | Thanks. We added school distribution of the 607 participants and the 196 international students who had sexuality in table 1 and table 5 |
| 3. The title of the article may need to be reconsidered. The non-probability sampling method and the sample of only 196 international students who had sexuality while studying in China are hardly representative of the international students who had sexuality in Hunan province. | Thanks for your comment. We agree that this is not a representative sample, and we added this as a limitation. Because the study topic is sensitive, in order to protect the privacy of the participants, we could not use systematic sampling or simple random sampling. Instead, we selected the top 10 universities which held 90% of the international students as our target population, and flyers were posted in their post boards, and electronic flyers were sent through Wechat or QQ groups. This kind of method is similar to cluster sampling, but we could not guarantee everyone saw this flyer. The small sample size is largely due to the sensitivity of the topic and less to the compensation (10 RMB = 1.5 US dollars). |
| 4. page 13, line 35 mentions that there are changes to the original questionnaire. 'a 22-item questionnaire was developed based on a previous | Thanks for your comment. Actually, the 22 items for this new instrument were adopted from the original version (which has more than 22 items), and the response to condom use was changed from 3-point Likert scale to 5-point Likert scale. The content validity of this new instrument was 0.92 and the test-retest reliability was 0.88. This has been |

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| questionnaire exploring sexual behaviors among Chinese men who have sex with men (MSM) ²³ . How does it differ from the original questionnaire? Will these differences affect the reliability and validity of the questionnaire? | clarified and highlighted on page 7, line 18-21. |
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VERSION 2 – REVIEW

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| REVIEWER | Chunyan Li University of North Carolina at Chapel Hill, Health Behavior |
| REVIEW RETURNED | 28-Mar-2022 |

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| GENERAL COMMENTS | <p>Thanks to the authors and the editors for inviting me to review the resubmission. The manuscript has been greatly improved from the previous version. Below are some minor comments.</p> <ol style="list-style-type: none"> 1. Page 4, line 54-59, the sentence “However, two studies ...had adequate HIV related knowledge” may be separated into two sentences for easier reading. 2. Page 5, line 7-15, the paragraph “in terms of transnational HIV/STI” seems out of place here. May consider moving it up to line 20, right before the sentence “international students, as a special international traveler group” 3. Throughout the manuscript, change “HIV/STI infections” into “HIV/STI”. STI stands for sexually transmitted infections. 4. Throughout the manuscript, replace “scholar” with “researcher”. 5. Page 9, line 43 “had not bought any medical insurance”: “bought” or “covered”? Is it possible that some type of scholarships includes health insurance so that the students wouldn't need to buy insurance plans? This level of information detail might not be able to verify given the current survey design, but I'm wondering if “covered by any medical insurance” would be a better alternative phrase here. 6. Page 11, line 38-42: Is it possible that more students who were in fact having STI prior coming to China but were not diagnosed? This may worth discussion. 7. Page 11, the first sentence of the last paragraph: add “inconsistent” in front of “condom use”. 8. Page 12, line 39: instead of “relevant sex education”, “tailored and culturally appropriate sex education” might be a better phrase? Since international students may have different cultural backgrounds and hence different beliefs and behaviors in sexual health-related care utilization. 9. Page 13, first paragraph: What are the potential mediators between “long-term travel”/“situating in an unfamiliar environment” and having sex? In other words, in the specific sample of this study (international students residing in China), how long-term travel/new environment have an impact on international students' intention, motivation, or other psychological constructs related to the behavior of having sex? The following statements of comparing sex education across continents is helpful but did not provide a direct explanation. |
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| | <p>The acculturation theory in the following paragraph touches a bit on this. But besides acculturation, what are some of the other potential pathways? Some possible examples may include: lack of efficient messaging of available sexual health services/care products to international students (structural factors), anticipated discrimination (societal factors), minority stress, coping mechanisms, etc.</p> <p>10. Page 14, last sentence of the first paragraph: There is no direct evidence from the study findings to support such causal assumption. I would suggest taking this sentence out.</p> <p>11. Page 16, last sentence of the limitation paragraph: what were the participants for the pilot testing?</p> <p>12. Page 17, last line in the conclusion paragraph: Instead of phrasing it as "to prevent HIV/STI and transnational transmission", would it be more helpful for international readers if rephrasing it around promoting sexual health among international students?</p> |
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| REVIEWER | Yong Cai Shanghai Jiaotong University, School of Public Health |
| REVIEW RETURNED | 19-Mar-2022 |

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| GENERAL COMMENTS | Conclusions about the use of condoms by gender are not entirely convincing, because the subjectivity of participants' condom use is uncertain. |
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VERSION 2 – AUTHOR RESPONSE

| Response to Reviewer #1: | |
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| Comments | Answers |
| 1. Page 4, line 54-59, the sentence "However, two studies ...had adequate HIV related knowledge" may be separated into two sentences for easier reading. | Thanks! We separated this sentence into two sentences in line 1-4, on page 5. |
| 2. Page 5, line 7-15, the paragraph "in terms of transnational HIV/STI" seems out of place here. May consider moving it up to line 20, right before the sentence "international students, as a special international traveler group" | Thanks for your comment. We addressed this comment during our first revision and this sentence is no longer in the manuscript. |

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| 3. Throughout the manuscript, change "HIV/STI infections" into "HIV/STI". STI stands for sexually transmitted infections. | Thanks for your comment. In order to correct the misunderstanding, we chose "STD" as a short for "sexual transmitted diseases", and we spelled out the full name for the first time use in the main text. During the Discussion section, we kept the "HIV/STD infection" expressions. |
| 4. Throughout the manuscript, replace "scholar" with "researcher". | Thanks! We replaced it as suggested. |
| 5. Page 9, line 43 "had not | Thanks for your good comment. We replaced it with "covered by any medical insurance". |

VERSION 3 – REVIEW

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| REVIEWER | Chunyan Li University of North Carolina at Chapel Hill, Health Behavior |
| REVIEW RETURNED | 16-Apr-2022 |
| GENERAL COMMENTS | <p>Thanks to the authors for addressing the comments, and I apologize for any inconvenience caused by my mistake in using the wrong version for the last review.</p> <p>One minor comment: if it's not too much work, I would suggest replacing "STDs" with "STIs" (not "STIs infection") throughout the manuscript. My original comment in the last round of review was not to suggest changing "STI infections" into "STD", but was to point out that STIs already include "infections". Some certain types of infections are not necessarily considered as diseases, so STIs might be a more accurate/inclusive term.</p> |