Author's response to reviews

Title: Substance use, risky sexual behaviors, and their associations in a Chinese sample of senior high school students

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Author's response to reviews: see over
Dear Editor,

We have revised the manuscript ID 1474625571774489 entitled "Substance use, risky sexual behaviors, and their associations in a Chinese sample of senior high school students" in accordance with the editors’ suggestion. In the revised version, we have supplemented two sections: Competing interests and Authors’ contributions. Moreover, we have responded to each of the points made by the reviewers.

We hope that our revised manuscript is acceptable for publication in the BMC Public Health. We would appreciate any constructive comments for further revisions.

Sincerely yours,
Shenghui Li, MD, PhD
Hong Huang, MD, PhD

Responding to each of the points made by the reviewers:

Referee(s)’ Comments to Author:

Reviewer: 1

This is an interesting report of a survey of senior high school students from Shangai, China. Although important information is presented, there are a number of concerns. All should be considered Major Compulsory Revisions.

1. First, on page 5, the manuscript appears to suggest that 1.3 million (adolescents) comprise 24.25% of 1.3 billion (total population of China). But by my calculation, 1.3 million is .1% of 1.3 billion. The ideas in this paragraph should be clarified.

Re: China has a population of about 1.3 billion. Of this 1.3 billion, 24.25% were adolescents and youths aged between 14 and 29 years in 2009 (State statistical bureau of the People’s Republic of China, 2009). We have reorganized the paragraph to make the description clear.
2. Second, on page 6, the report states that 700,000 people living in China are infected with HIV (2008 reference), but that this is expected to grow to 10 million by 2010 (which would be this year!) Nothing in the current report would suggest this sudden 14-fold increase. Perhaps this projection was made a decade ago, and the expected increases simply have not materialized. In fact, the current report suggests that HIV will be slow to spread in China, given the low prevalence of sexual intercourse among youth, and especially among young women, who are more likely than men to become infected at early ages.

Re: According to the suggestion, we have updated the information according to the new literature. However, for the best of our knowledge, we didn’t get information that people infected with HIV perhaps reached 10 million by 2010.

Just as what the reviewer pointed out, the growth of the HIV/AIDS epidemic in China is slowing down. However, the challenges for HIV/AIDS control are ever bigger than before due to three major shifts in the route of HIV transmission in China: from parenteral to sexual, from high-risk groups to the whole population, and from predominantly rural areas to both rural and urban areas.

3. Sampling was limited to Shanghai; thus, it is misleading to state on page 12 that this report is based on a representative sample of Chinese senior high school students. (You clarify this in the limitations, but it should be corrected on page 12 in the opening of the Discussion Section). It is not completely clear whether the sample is representative of Shanghai senior high school students, since you seem to indicate in the limitations (last sentence) that not all demographic sub-groups are included. This also needs to be clarified. Given the cosmopolitan nature of Shanghai in comparison to the rest of the country, and especially compared to rural China, one could assume that the stated prevalence of sexually experienced youth in this report
is much higher than the actual prevalence in China, even though by Western standards it is very low.

**Re:** Just as the clarification in the limitation, our findings may not reflect the overall practice in China. We have done the corresponding correction in the opening of the Discussion Section.

The study was specifically designed to perform in urban area in Shanghai (which has been described in Method Section “Sample and Procedure”: There are twenty districts in Shanghai, 11 being located in urban area, 9 in suburban, and 1 in rural area. From 11 urban districts, two were randomly selected and for every district, 5 senior high schools were randomly selected.). Therefore, our study only has representative of senior high school students in urban area of Shanghai. We have further emphasized the representative of our sample in Discussion Section.

4. It is not clear what you mean by “unprotected sex” in the study. Does this mean barrier method contraception, such as condom use? Or does it include other forms of contraceptive protection? Either way, this still represents a very small percentage of the sample (e.g., 42% of 5% = 2.1%).

**Re:** According to the literature [1-3], “unprotected sex” refers to “sexual intercourse without condom use”. Our study adopted the concept of “unprotected sex” and specifically defined it as “didn’t use condoms during sexual intercourse”.

We have supplemented explanation when “unprotected sex” was used at the first time in our manuscript.

China has a total population of about 1.3 billion. Of this 1.3 billion, approximately 25% (0.33 billion) were adolescents and youths aged between 14 and 29 years (State statistical bureau of the People’s Republic of China). 2.1% of 0.33 billion is 6.9 million, which still is a very large population. Therefore, behind a very small percentage present, it is a big population.
In the context of the critically difficulty of HIV/AIDS control in China, this study schemed to comprehensively examine the characteristics of risky sexual behaviors and substance use in Chinese adolescents and youths.

**References:**


5. The association with cigarette smoking is interesting and an important, though rarely acknowledged association. It is likely related to a willingness to break norms. However, the implication stated on page 13 that substance use adversely affects people’s decision making, is quite a stretch with cigarette smoking. Problem behavior theory is a better fit.

**Re:** In term of substance use and high-risk sexual behaviors, although the results were inconsistent, most studies tended to demonstrate that there was an association between substance use and risky sexual behaviors. Substance use included not only cigarette smoking but also alcohol drinking and illicit drug use. Our study didn’t find the association between alcohol drinking and risky sexual behaviors. However, cigarette smoking was found to be significantly related with risky sexual behaviors. I agree with the review, this is an important and interesting finding. In future research, we will do more about the question.

So far, the possible mechanisms used to explain the association between substance use
and high-risk sexual behaviors include the theory of decision-making and clustered problem behavior. We have added more about the problem behavior theory.

6. On page 14, proportion of multiple partners does not seem so high when you consider the low prevalence of any sexual behavior. It is not surprising that the only significant relationship in multivariate analysis is with the age of sexual debut, since longer time since first sex gives more time to have more than one partner. At the bottom of that page, I am not completely clear why age of first sexual intercourse is “advanced” since a few years ago. Are you comparing data from a similar sample in Shanghai? I expect that youth in the rural areas have a later age of sexual debut. This needs to be clarified. On page 15, you give many reasons why Shanghai might be different from the rest of the country (e.g., rapid economic development, mass migration, access to internet, awareness of overseas norms). Perhaps the difference is comparing a Shanghai sample to a broader sample. If not, you should make clear the samples that are being compared.

Re: We agree with the review that longer time since first sex gives more time to have more than one partner. But at the same time, we have to consider that childhood sex could be a problem behavior and children with early sex perhaps easy to have other problem behaviors. In addition, a more recent study in men who have sex with men (MSM) found that MSM with a history of childhood sex were more likely to report frequent casual partners and therefore more likely to be HIV positive and to engage in unprotected intercourse.

In our sampled adolescents with sexual intercourse experience in lifetime, age of first sexual intercourse was distributed as: ≤14 years (16.4%), 15-17 years (49.5%), and ≥18 years (34.4%). Between 2001 and 2005, the percentage of adolescents who initiated first sexual
intercourse <18 years was approximately 20-30%, which was much lower than our finding. From the data comparison, we figure out that age of first sexual intercourse in adolescents of Shanghai urban area was much younger than before.

    Just as the reviewer pointed out, youth in the rural areas perhaps have a later age of sexual debut. However, we couldn’t find literature report regarding sexual behaviors among adolescents and youth in rural area of China.

    With regard of page 15, we have reorganized to make it much clearer.

7. Your conclusions (on page 17) need some editing. Your English is excellent to this point, but this section is a bit rough (see first sentence especially, but also throughout this paragraph.) I agree with your overall point, that a small proportion of youth appear to have problems that put them at higher risk. But it is not clear how best to address such a problem. It is not likely that knowledge is the key, since health education and other awareness programs have consistently been shown lacking as a way to change behavior among high risk youth. Another important point you could make is that a small proportion of youth in China equals a very large number of people. However, one can only generalize this population to Shanghai youth in school.

    Re: According to the suggestion, we have reorganized the paragraph.

    We agreed with you that how to change behavior among high risk youth is a big challenge. Therefore, we need to do a lot of work to find an effective intervention scheme to address the problem. But anyway, the first procedure is to know risk behaviors and their influential factors among adolescents and youths. Based on the findings of our previous research, we are trying to explore effective schemes to control the problems. If we can get some progress, we hope to have opportunity to discuss with you.
**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

Re: We have tried our best to do language corrections.

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:** I declare that I have no competing interests.

**Reviewer: 2**

**Major Compulsory Revisions**

This manuscript describes a cross-sectional survey of Chinese students attending high school in Shanghai. The authors note that the spread of HIV/AIDS has entered a critical stage in China and it is imperative that researchers and practitioners know more about risky sexual behavior and substance use among adolescents. I was not able to confirm the following point because some of the research cited is available only in Chinese, but it appears that earlier work on this topic in China reflects only or primarily community-based samples. The authors state the purpose of this current study is to examine "risky sexual behaviors and substance use in a sample of high school students of China." Thus, the work is intended to be primarily descriptive and to yield prevalence estimates.

I have several concerns related to the study's methods. Most importantly, because the current survey is limited to 10 schools based in two of twenty districts in Shanghai (I think this is correct, the description of sampling is a bit confusing), it is not clear exactly what population this sample is intended to represent. From this perspective, it is not clear what this work adds beyond studies that have already been done in single districts with presumably similar sampling techniques. Although the authors note that Shanghai is the largest city and attracts many migrants, there is no clear rationale given for why sampling done this way is important
and how it adds to the literature. They do note in their limitations that their findings may not generalize to youth in other areas of the country. More detail about cluster-stratification sampling procedures and the populations that they represent is needed, as is a stronger rationale for how this analysis advances this literature.

Re: This study adopted a two-stage random cluster-sampling design. There are twenty districts in Shanghai, 11 being located in urban area, 9 in suburban, and 1 in rural area. From 11 urban districts, two were randomly selected and for every district, 5 senior high schools were randomly selected. All the students in selected schools yielded the study sample. Therefore, our study sample is intended to represent senior high school students in urban area of Shanghai.

During recent years, there were major shifts in the route of HIV transmission in China: from parenteral to sexual, from high-risk groups to the general population [1-3]. Sexual contact continues to be the major and increasing route of HIV transmission [1-3]. In the context of the efforts to control the transmission of HIV, a full understanding of risky sexual behaviors among general adolescents and youth is great needed. This necessity is further underscored by the fact that most published studies on risky sexual behaviors involved in high-risk groups. For the first time, this study specifically examined the characteristics of risky sexual behaviors among general Chinese adolescents and youth. Moreover, we particularly explored the risk factors of unprotect sexual intercourse and multiple-partner sexual intercourse in the sample.

Shanghai, the biggest city and metropolises in China, attracts many people of other districts and even other countries to settle and is labeled as a migration city. The ongoing social, cultural, value, and belief mixing may promote the upward trend of exposure to risk behaviors in adolescents and youths. However, for the best of our knowledge, there is no comprehensive
data on sexual behaviors, substance use, and their associations among this special population. And just because of these characteristics, our findings may not generalize to youth in other areas of the country.

According to the reviewer’s suggestion, we have added more details about cluster-stratification sampling procedures and the populations that they represent.

References:


The paper would also be strengthened by more thoughtful discussion about the prevalence figures generated in this study relative to others, especially countries with varying levels of HIV; discussion of the implications of these differences is also needed. The authors note that their behavioral estimates and the patterns of covariation among risk behaviors (i.e., substance use and unprotected sexual activity) are similar to those of other studies in China (as well as other countries), so again it is not clear exactly what new information or insights this analysis has provided for the Chinese context. More thoughtful elaboration, as suggested above, would help to address this issue.

Re: According to the reviewer’s suggestion, we have supplemented the discussion of the differences and their implications of the prevalence figures generated in this study relative to other countries.

There are a large number of sexual behaviors reported in Table 2, however, only two
sexual outcomes are included in multivariate analysis. It is not clear why this choice was made.

**Re:** Previous study demonstrated that unprotected sexual intercourse (defined as “sexual intercourse without condom use”) and multiple-partner sexual intercourse were the most common mode of sexual transmission of HIV infection among adolescents and youth. Therefore, unprotected sexual intercourse and multiple-partner sexual intercourse were defined as risky sexual behaviors in the present study. That’s the reason why only unprotected sexual intercourse and multiple-partner sexual intercourse as outcomes are included in multivariate analysis.

Justification is needed for the forward likelihood-ratio stepwise elimination procedure. The analyses reported in Table 3 yield no predictors other than substance use and age at first sex. These correlations have been demonstrated many times in many contexts. Why is this important to demonstrate in this context? Again, more rationale is needed. A more minor point: Is current age still in the model that shows age at first sex to be a predictor of multiple partners? If not, the association with age at first sex may simply reflect the opportunity to collect more partners (more time has passed), not a faster rate of partner accumulation.

**Re:** Multivariate logistic regression analyses were performed to examine the correlating factors of ongoing unprotected sexual intercourse (defined as “sexual intercourse without condom use”) and multiple-partner sexual intercourse. Therefore, the regression model was adjusted all the possible risk factors simultaneously.

The reviewer pointed out that “The analyses reported in Table 3 yield no predictors other than substance use and age at first sex. These correlations have been demonstrated many times in many contexts”. For the best of our knowledge, this is the first time that we found the
association of substance use and age at first sex with unprotected sexual intercourse and multiple-partner sexual intercourse.

Our study showed that age at first sex was a predictor of multiple partners. We agree with that young age at first sex reflect the opportunity to collect more partners (more time has passed). However, a very recent study demonstrated that young age at first sex was more likely to be HIV positive and report frequent casual sex partners.

References:

Although the authors note the limitations of cross-sectional design, in the discussion section greater care is needed in language related to causality. For example, the authors essentially imply a simple causal relationship between smoking and unprotected sex (i.e., that substance use – tobacco? – impairs judgment). Clearer distinctions among types of substances and their potential implications is needed. (This issue may be partly a function of language difficulties.) It would also be useful to put these research questions into theoretical context at the outset of the manuscript and to use that context to guide analysis and discussion. For example, Problem Behavior Theory – clearly relevant – is only mentioned in passing near the end of the paper.

Re: We have reorganized the Introduction and Discussion according to the suggestion.

The authors note evidence suggesting secular changes in the timing of sexual onset among Chinese adolescents. It is hard to evaluate these comments because no information is offered about the methods used in earlier studies. Large differences between the two studies may simply reflect methodological differences.
Re: We have revised the corresponding paragraph according to the suggestion.

Minor Essential Revisions:

A second (more minor) concern is the conditions under which questionnaires were completed. The study was school based and questionnaires were anonymous, but it would be useful to know if they were completed in a group setting (probably so) and whether teachers were able to see the responses of students. Both of these have implications for the candor of student responses.

Re: The survey was implemented during a regular health education class. In the class, an anonymous questionnaire was given to the students. Researchers explained the study purpose to the students and emphasized that participation was voluntary. Every student completed the questionnaire on his/her own desk. Other students and teachers were not able to see the responses of students. We have supplemented more detailed information about questionnaire filling.

The information presented about Cronbach’s alpha is confusing; is the .88 figure the mean of the various subscales?

Re: Cronbach’s alpha coefficient was 0.88 for the overall questionnaire and ranged from 0.71 to 0.78 for the dimensions.

More detail is needed about measures; logistic regression was used for multivariate analysis, but it is not clearly stated that outcome measures are dichotomous. How are predictors coded in the regression models, as dummy variables?

Re: In the multivariate analysis, outcome measures are dichotomous. We have added
more detailed information according to the suggestion.

Multivariate logistic regression analyses were performed to examine the correlating factors of ongoing unprotected sexual intercourse (defined as “sexual intercourse without condom use”) and multiple-partner sexual intercourse. All socio-economic and demographic characteristics variables and substance use variables were entered into the models with the dependent variable designated as “1” if ever had unprotected sexual intercourse/multiple-partner sexual intercourse within last three months and “0” if there was no. So, outcome measures are dichotomous.

For dependent variables, those who had three or more categories were coded as dummy variables.

A number of results are reported in the discussion section; they should be moved to the results section and interpreted in the discussion section.

**Re:** We have moved all results to the Results section and interpreted the finding in the Discussion section.

In Tables 1 and 2, the n’s listed for males and females do not add up to the total n.

**Re:** There were missing data in the questionnaires. 35 students didn’t provide gender information.

**Level of interest:** An article of insufficient interest to warrant publication in a scientific/medical journal

**Quality of written English:** Needs some language corrections before being published

**Re:** We have tried our best to do language corrections.
**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:** I declare that I have no competing interests.

**Reviewer: 3**

Review of Li et al: Characteristics of sexual and substance use behaviors among Chinese senior high school students

This study aimed to examine: “characteristics of risky sexual behaviors and substance use” as well as the risk factors of unprotected sexual intercourse and multiple-partner sexual intercourse in senior high school students in two school districts in Shanghai, China. In general, the paper is well organized and presents a logical flow. The justification for the study is well established, and the paper, for the most part, cites relevant literature. These strengths notwithstanding, several aspects of the paper would benefit from further clarification or revision on the following points:

1. **Study objectives:** The first study objective “comprehensively examining characteristics of risky sexual behaviors and substance use” needs further definition. It appears that the authors assessed the association between socio-demographic factors and substance use behaviors with risky sexual behaviors in a sample of senior high school students.

   **Re:** We have reorganized the Study objectives according to the suggestion.

2. **Methods**
   a. The sampling procedure for selecting the school districts needs further clarification. Were districts selected using a systematic sampling procedure (random numbers table?) based on probability proportionate to size? Were districts purposefully selected to gain geographic representation of the Shanghai area? With a selection of only two districts out of twenty, it
would seem that a purposeful sampling procedure would be appropriate (e.g., selecting districts with greatest population or with specific characteristics) given the challenges of achieving representativeness of the original sampling frame of twenty schools based on two school districts. Regarding selection of high schools, were these randomly selected, or selected based on probability proportionate to size?

**Re:** According to the suggestion, we have reorganized the description of sampling procedure and supplemented more detailed information.

b. Study sample and administration of questionnaire: More details are needed on the study sample and how the questionnaire was administered. P.7, paragraph 1 states: “All the students in selected schools yielded the study sample.” This sentence is not clear. Do the authors mean that all students in selected schools comprised the study sample (universe/sampling frame)? When and where was the questionnaire administered? For example, was the questionnaire administered during regular school hours while students were in class, or was the questionnaire sent home with students? Were the 2,995 students eligible for the study based on the number of students enrolled in a given school, or the number of students present on the day that the questionnaire was administered? The authors indicate that 89.1% of students returned a completed questionnaire. Furthermore, was the questionnaire administered only with classes of seniors in each school? Was the questionnaire administered to all classes of seniors in a given school, or were classes sampled? Were students offered an alternative activity if they choose not to participate in the study?

**Re:** According to the suggestion, we have reorganized the description of questionnaire administration. More detailed information has been supplemented.
c. P.7, second paragraph: Consent and protection of human subjects procedures need further specification. For example, “Permission was obtained to carry out the study…” Who was permission obtained from? Also, was parental permission obtained for students to participate in the study, as common in research with children under the age of 18 years in westernized countries? Was student assent obtained from students? While the authors indicate that the study was approved by the Ministry of Education of the People’s Republic of China, they do not specify whether the study was subjected to an Internal Review Board to ensure protection of human subjects.

Re: According to the suggestion, we have supplemented more detailed information about consent and protection of human subjects.

d. Measures: Further description is needed on the study instrument and the study measures.

i. While we learn that the instrument was developed based on literature review, a pilot study, qualitative research, and reliability assessment, no details are provided on these procedures. For example, were the measures informed by previously used measures on this topic? If so, the references for these instruments/measures are needed.

Re: According to the suggestion, we have supplemented more detailed information, along with the reference, about the development of the instrument.

ii. What were the aims of the qualitative research and the pilot study, how were these conducted, and how did they inform the development of the measures?

Re: The Adolescents’ HIV/STI Risk Behaviors Questionnaire (AHRBQ), a self-administrated questionnaire, was used to collect information on adolescents/youths’ behaviors related to sex and substance use. The AHRBQ was derived from our previously
established instrument “The Adolescents' Reproductive Health Questionnaire (ARBQ)”. The ARBQ was used to collect information on adolescents' knowledge, attitude, and behaviors concerning HIV/STI, which has been described previously [Ref]. Based on the 11 items regarding HIV/STI related behaviors in ARBQ, the AHRBQ was developed by adding 9 items according to an updated literature review, qualitative interview in pilot study (a small sample survey), and reliability assessment.

Reference


iii. With regard to the internal consistency assessment, given that the authors did not analyze the data by composite variables or scales, it is not clear what additional information this assessment yielded. Furthermore, it is not clear why the authors assessed the internal consistency of the overall questionnaire (substance use, sexual behaviors, demographic variables?) - was this intended to assess a specific construct? More description on the rationale for the reliability assessment is needed. It would seem that other measures of reliability (e.g., test-retest reliability) would have been more informative.

Re: The test-retest reliability was assessed in a pilot study with a volunteer sample of 116 students who responded to a request to complete a second rating of the Chinese version of the CSHQ at a four-weeks interval.

Test-retest reliability of the AHRBQ was examined by test-retest intraclass correlation coefficients (ICCs). ICCs of 0.70 or higher were considered to show excellent test-retest reliability and ICCs of 0.50-0.70 to indicate moderate test-retest reliability. (Ref: Deyo RA, Diehr P, Patrick DL. Reproducibility and responsiveness of health status measures. Statistics and strategies for evaluation. Control Clin Trials. 1991;12:142S-158S)

As show in table below, the test-retest reliability was excellent (Intraclass correlation coefficients was 0.85 for the overall questionnaire and ranged from 0.60-0.88 for subscales).
The test-retest reliability of the AHRBQ

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>ICCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>exposure to sexual behaviors in lifetime</td>
<td>113</td>
<td>0.69</td>
</tr>
<tr>
<td>exposure to sexual behaviors in last three months</td>
<td>116</td>
<td>0.76</td>
</tr>
<tr>
<td>exposure to drug-use behaviors in last three months</td>
<td>115</td>
<td>0.76</td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>0.85</td>
</tr>
</tbody>
</table>

iv. Further details on the instrument are needed. For example, how many total items were included on the instrument? A table with the specific questions (stems and responses) (and/or an annex with the questionnaire) would be helpful. It would also be helpful to know if these measures were used in previous research in China or other countries given the importance of comparability across studies. Connecting these measures to previously established work on sexual risk behavior and substance use would strengthen the overall study.

Re: The final version of the AHRBQ included 20 items and was conceptually grouped into 3 dimensions: ① exposure to sexual behaviors in lifetime (6 items); ② exposure to sexual behaviors in last three months (10 items); ③ exposure to drug-use behaviors in last three months (4 items). Specific frame for each item of the dimension has been noted in Table 2.

v. It is not clear how ‘unprotected’ sexual intercourse was defined. “Unprotected” is open to interpretation and is not specific. It does not appear that authors included specific questions on condom use or other birth control methods. Given the focus on HIV and risky sexual behaviors, the omission of specifically asking about condom use is an important limitation of the study that merits mention in the limitations section.

Re: In the present study, unprotected sexual intercourse was defined as “sexual intercourse without condom use”.

In the questionnaire, the corresponding questions were “If you ever did not use a condom
during sexual intercourse in your lifetime? “If you ever did not use a condom during sexual intercourse in the last three months?”

vi. No description is provided on reliability or validity of substance use measures.

**Re:** We have supplemented information on internal reliability and test-retest reliability in the last paragraph of “Measure HIV/STI risk behaviors” section.

3. Results:

a. P.11, paragraph 1: Why is masturbation included in a study of sexual risk behavior? There is no evidence to suggest that masturbation is a sexual risk behavior. If anything, masturbation should be considered safe sex.

**Re:** We agree that masturbation should be considered safe sex. It seemed that masturbation (including mutual masturbation) has merit in the protection and intervention of HIV/STD transmission. In the present study, we just want to know a little about masturbation in Chinese adolescents and youth.

Reference:


b. P.11, last paragraph: “confounding factors”- this sentence either needs to insert “potential confounding factors” or just state “controlled for sociodemographic factors and substance use behaviors”.

**Re:** We have revised the paragraph according to the suggestion.
c. No information was provided on marital status, given that some students were 23 years old. Were these data collected? If not, lack of information on marital status should be cited as a limitation.

Re: Our survey was conducted in senior high school students. In China, high school students are not allowed to get married. So all sampled students in the present study were unmarried.

4. Discussion:

a. P.12, paragraph 1: “Moreover, we particularly explored the risk factors of unprotected intercourse…” I would clarify this statement with stating “…explored the association of substance use and socio-demographic factors with unprotected…”

Re: We have revised the sentence according to the suggestion.

b. Discussion lacks explicit acknowledgement that, overall, sexual risk factor prevalence (lifetime sexual use, multiple partners, etc.) was very low in this sample compared to other countries. Thus, what are the implications for public health efforts in China? Is it reasonable to expect that prevalence of lifetime sexual intercourse can be decreased in this age group? Or do these data provide important baseline data to measure prevalence of lifetime sexual intercourse over time? Is there an expectation that percentage of students having sex will increase?

Re: Our study showed that the proportion of senior high school students who ever had sexual intercourse was 7.0%. A number of previous studies revealed that the prevalence of lifetime sexual intercourse was ranged from 1.3% to 4.8% in Chinese senior high school students only a few years ago (from 2004-2007). Compared to their peers a few years ago, adolescents in big Chinese cities nowadays seemed to be becoming more and more sexually
active, which may lead to an increase of sexual behaviors and a shift to younger age of first sexual intercourse. Therefore, although sexual behaviors, compared with other countries, in our sample were very low. We should pay close attention to the problem.

c. P. 14: “Contrast to a few years ago, age of first sexual intercourse in Chinese adolescents and youth had been obviously advanced.” This sentence is not clear to me.

**Re:** We have reorganized the sentence according to the suggestion.

d. P.15: “Compared to their peers a few years ago, Chinese adolescents and youths nowadays were becoming more and more sexually active, which lead to an increase of sexual behaviors and advancement of first sexual intercourse.” What was the prevalence of sexual intercourse a few years ago? Do the findings of the current study support this statement, that youth are becoming more sexually active?

**Re:** We have supplemented necessary data and references in the paragraph according to the suggestion.

Discretionary Edits

5. P.10, first paragraph: I would recommend highlighting the age of the participants here and provide some description of their sociodemographic characteristics (as listed in Table 1).

**Re:** We have done the revision according to the suggestion.

6. P.10, second paragraph: I would recommend included the sample size of the 7% in the text (“…had sexual intercourse was 7.0% (n = 188).

**Re:** We have done the revision according to the suggestion.
7. It is curious that girls reported a higher educational level of parents compared to boys. One would not expect educational level of parents to vary by gender among students within the same schools. What are the authors’ thoughts on this?

**Re:** Our survey found that there was statistical difference in educational level of parents between boys and girls. Based on the study, it’s not easy to explain the finding. The sample of our sample is comparatively large, a minor difference could be statistically significant in data analysis.

8. Age of first sex: when the mean age of the sample is 17 years, it seems odd to report the percentage of the sample that had sex under age 18 years. I would recommend highlighting those who had sex under 17 (15-17 and <=14 years).

**Re:** We have done the revision according to the suggestion.

9. P.15: 3rd paragraph: causality: This sentence should read: “The cross-sectional nature of the study preclude inferences on causality” (not ‘make it difficult’ as you cannot infer causality from a cross-sectional study design.)

**Re:** We have done the revision according to the suggestion.

10. I would recommend exploring another study title that is more explicit (for example, “The association between socio-demographic and substance use behaviors with sexual risk behaviors in senior high school students in Shanghai, China”)

**Re:** According the suggestion and another reviewer’s advice, the title has been revises as “Substance use, risky sexual behaviors, and their associations in a Chinese sample of senior high school students”.
Minor Edits

11. P.4, 3rd paragraph: “…accounting for half of new HIV infection each year”: need to clarify “In the United States.”

Re: We have done the revision according to the suggestion.

12. P.5: first paragraph: “Of this 1.3 [b]illion, 24.25% were adolescents and youths aged between 14 and 29 years [in 2006]…”

Re: We have done the revision according to the suggestion.

13. Grammar and sentence structure: While the translation of the paper and the paper’s writing style for the most part are strong, the paper would the nonetheless benefit from review by a professional editor.

Re: We have tried our best to improve the language expression. Moreover, the revised version of the paper has been reviewed by an editor whose native language is English.

14. P.8: “…was defined as large family;” I would recommend using the term “extended family”.

Re: We have done the revision according to the suggestion.

15. “America” should be “United States”

Re: We have done the revision according to the suggestion.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable
Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests: I declare that I have no competing interests