

## PEER REVIEW HISTORY

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### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Characteristics of Low-tier Female Sex Workers Who Engage in Commercial Sex with Old Male Clients in Zhejiang Province, China: A Cross-sectional Study
<b>AUTHORS</b>	Jiang, Tingting; Pan, Xiaohong; Ma, Qiaoqin; Jiang, Jianmin; Chen, Lin; Wang, Hui; Zhou, Xin; Chen, Wanjun

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Haque, Mainul National Defense University of Malaysia, Faculty of Medicine and Defense Health, Pharmacology
<b>REVIEW RETURNED</b>	07-Mar-2021

<b>GENERAL COMMENTS</b>	Good Work  Please Add Ethical Approval Body FULL NAME with Reference No and Date. Methods should be STRUCTURED Study Design Study Population Study Area Study Period Sampling Method Sample Size Calculation Questionnaire Validation Process and Score  Please add a separate section of recommendation and Article Highlights. Article Highlights will be in BOX 4/5 bulleted sentences
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<b>REVIEWER</b>	Amogne, Minilik Lunds Universitet, social medicin and global health
<b>REVIEW RETURNED</b>	08-Mar-2021

<b>GENERAL COMMENTS</b>	Dear Author It is a well-written manuscript, and I appreciate your trial to get deep into the causes that expose sex workers to unwanted outcomes. Such kind of public health issues is a sum of small pieces of factors which led to those unwanted outcomes. I listed all my comments and suggestions below. Introduction The introduction is too long, try to condense it. Some of the information is more than enough so limit it, use only the recent ones. Methods
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	<p>Please have a separate section for the following parts in the method section</p> <ul style="list-style-type: none"> <li>- Study process - explain including the consent process</li> <li>- Ethical clearance</li> </ul> <p>Result</p> <ul style="list-style-type: none"> <li>- In the result section, only mention one main result from a variable, leave the rest of the result for the table, otherwise, the relevance of the table will diminish. For example, for marital status or educational status mention only one main result</li> <li>- When you mention the regression results please only mention the result and delete all of your texts after 'Versus'. For example, you say "those who had engaged in commercial sex with young clients versus those who did not". Delete the statement after versus and do this for all, because the first is explanatory by itself.</li> <li>- In addition, mention the odd ratio numbers for the multivariate analysis only; for univariate analysis part only mention the name of the variables which become significantly associated. It looks vast and makes it not interesting to read.</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>- Under discussion line 8 you mention that "Low-tier FSWs had low sociodemographic level". Please rephrase the sentence, the word 'low' might not explain all sociodemographic variables for example what is low for age??</li> </ul> <p>Conclusion</p> <ul style="list-style-type: none"> <li>- You stated that "Low-tier FSWs who engaged in commercial sex with OMCs were more vulnerable to HIV infection/STIs than those who didn't engage in this behavior"; but you did not conduct HIV testing and you did not use their HIV status to see whether low-tier FSWs are more HIV positive. Therefore do not conclude on the data that you did not collect. Your conclusion should only base on your results.</li> </ul> <p>My suggestion "Low-tier FSWs who engaged in commercial sex with OMCs reported more risky sexual behavior.</p>
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<b>REVIEWER</b>	Furr, Allen Auburn University, Sociology
<b>REVIEW RETURNED</b>	09-Mar-2021

<b>GENERAL COMMENTS</b>	<p>Thank you for submitting this paper to the Journal. It addresses an important public health area, and its findings should be relevant to program planners working in HIV/AIDS prevention.</p> <p>I have a few suggestions and recommendations to make your paper stronger. I will list them below in no specific order.</p> <ol style="list-style-type: none"> <li>1. The paper requires careful editing and rewriting. There are numerous typos, misspellings, awkward sentences, verb tense errors, and wrong words. For example, the sentence "The participants were recruited voluntarily", I believe, is meant to say that individuals participated voluntarily. But literally it states that they were recruited voluntarily, which, of course, is a different meaning. The words "exhibited" and "propaganda" were used incorrectly.</li> </ol> <p>In addition, the paper is rife with redundancies. It may be that different contributors wrote different sections of the paper without coordinating their efforts; at least, that's how the paper sometimes reads. As further example of that, some spellings and phrasing switch between American and British English (e.g. "behavior" and "behaviour". These problems make the paper's substance hard to follow at times.</p> <ol style="list-style-type: none"> <li>2. There are a few places in which textual references are unclear. On page 1 of the manuscript, "FSWs in China are classified</li> </ol>
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(sic) as high....". Classified by whom and for what purpose? How are the classifications measured? In the same paragraph: "Low-tier FSWs always have less understanding...." "Always" is an empirical term and requires specification. "Less understanding" is comparative and requires a reference: less than whom or what?

3. Page 2 of the text: the use of the word "elderly". I'm not sure many would agree that age 50 is considered elderly, unless it is a China-specific designation. If so, that should be clarified.

4. There is a disconnect between variables listed in the text and those in the tables. In addition, the variables listed in the text are not adequately operationalized. For example, age of client is divided in ordinal groups in Table 2: "young" and "middleaged (sic)". The study is about older clients. No rules have been provided to specify these divisions. In fact, age of client is not listed as a variable in the methods section. Other variables are similarly not specified. There is no operationalization of perception of HIV risk. Were the participants questioned about their perception or their behavior? That distinction is not clear. Or is the variable actually about the researchers' perception or assessment of risk? Clarity is needed here.

The self-efficacy regarding condom use measure is unclear. Three questions were asked, each having three possible responses. However, the range of scores is reported as 0-3. Since no values were assigned to the variable attributes, how these scores were calculated cannot be replicated.

Relatedly, how did participants determine the age of their clients? They reported their judgement of clients' age, but were there any determining factors they used? This might be of some importance regarding reliability of this measure.

In the list of variables on page 4 of the manuscript, "factors related to sexual behavior" is listed. This requires specification The table presents different sexual acts: is that what "factors" means? Please clarify this.

HIV/STI symptoms are assessed statistically, but are not listed in the methods section of the paper. In short, there should be consistency between the text and the tables, and each variable should be defined and operationalized.

5. Page 5 of the manuscript. The phrase "in order to adjust for possible confounding" needs elaboration. It is offered as a justification for the multivariate analysis, but the paper would benefit from a stronger and more detailed argument for this analysis. The goal of the paper was to "explore the correlates related to low-tier FSWs who engage in this specific behavior...." This statement does not necessarily imply the use of a more powerful and causal analysis. It may be the odds ratios are important, and they are, but the use of this technique should be explained to give the reader a greater understanding of what the odds ratios are saying.

6. I recommend elaborating on the sampling, if possible. All that is said is that "trained staff" from a public health center "reached out". Is there anything that should be known about how these women were recruited? This is a judgmental sample, which is ok, but what criteria were used to select these particular women? How did the health staff know them?

7. The text should contain references to the tables.

8. Page 9 of the manuscript -- How are high, middle and low tier sex workers defined? It is income, but what method divides them? For example, are they divided into thirds? That low-tier workers earn less money is self-evident and by definition and not necessary to mention, as done in the text.

	<p>9. Page 12 of manuscript -- I'm not sure how causality is affected by a cross-sectional design. That is not evident on face value and should be explained. The actual problem with making inferences is that the sample is not random but judgmental or convenient.</p> <p>10. Typically new data/results are not presented in the discussion section. For example, on page 11 of the text, contraception methods are mentioned for the first time; plus, they are not listed as a variable in the methods section. Usually, the discussion section begins with a short summary of the major findings, and the rest of this part of the paper is dedicated to explaining the findings theoretically and/or discussing their relevance for policy, planning, or clinical practice. I recommend re-writing this section to remove new findings, incorporating them into a more parsimonious results section, and making the implications of your data more clear.</p>
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### VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Mainul Haque, National Defense University of Malaysia, Faculty of Medicine and Defense Health

Comments to the Author:

Good Work

Please Add

Ethical Approval Body FULL NAME with Reference No and Date.

- Ethical Approval Body FULL NAME with Reference No and Date was added in “Ethical consideration” part of method section.

Methods should be STRUCTURED

Study Design

Study Population

Study Area

Study Period

Sampling Method.

Sample Size Calculation

Questionnaire Validation Process and Score

- Now, Study design, Study area, Study participants, Study period, Study process(Sampling method), are independent parts in the method section. Combining the comment of reviewer 2, we represent “Sampling method” with “Study process”.

The research objective for this study is to find out the high-risk behaviors and other factors related to HIV/STD infection and transmission among low-tier female sex workers(FSWs) in Zhejiang province, so as to provide a scientific basis for formulating and adjusting the strategies of behavior intervention, and optimizing the allocation of HIV prevention resources targeting low-tier FSWs. The research areas are all counties which implemented AIDS care project in this province. The research participants are all low-tier FSWs who met the recruitment criteria, and could be accessed and willing to participate in these areas. Therefore, sample size calculation was not conducted.

In the analysis of this mansuscript, 44.0% of low-tier FSWs had sex with old male clients. Since there is no corresponding sample size calculation formula to the present study design, referring to the calculation formula of simple random sampling, with  $p=0.44$ , the significant level  $\alpha=0.05$ ,  $Z_{\alpha}=1.96$ , admissible error  $d=p \times 0.1$ , the sample number should be 509. The actual sample size of this analysis is 2647, much larger than the estimated sample size. Therefore we argue that the results of this study could not be biased due to the sample size.

There is a paragrapg describing the questionnaire development. Regarding the questionnaire

validation process, we did not take this step, which is a deficiency in our questionnaire development process. We will value this in the future questionnaire design process. Many thanks for reviewer's advice.

Of "Questionnaire development and measures" in the method section of the original manuscript, the paragraph for questionnaire development, is moved to present "Study process" part.

Please add a separate section of recommendation and Article Highlights.

Article Highlights will be in BOX 4/5 bulleted sentences

- "Strength and limitation of this study" is already put in this manuscript.

Reviewer: 2

Mr. Minilik Amogne, Lunds Universitet, Ethiopian Public Health Institute

Comments to the Author:

Dear Author

It is a well-written manuscript, and I appreciate your trial to get deep into the causes that expose sex workers to unwanted outcomes. Such kind of public health issues is a sum of small pieces of factors which led to those unwanted outcomes. I listed all my comments and suggestions below.

Introduction

The introduction is too long, try to condense it. Some of the information is more than enough so limit it, use only the recent ones.

- We simplified the introduction now.

We deleted the following sentences:

"and consistent condom use would decrease while having sex with regular clients [15]" in the 2th paragraph.

"over 20% of all newly diagnosed HIV cases are now in people 50 years of age and older, and", and "with a higher proportion of newly diagnosed HIV cases being male in the older group (81.2%) than in the younger group (74.6%)" in the 3th paragraph.

"The main infection mode among older infected persons is heterosexual sex[21]" in the 4th paragraph. "and 46% of HIV cases were men over 50 years of age in one southern province of China[22]" in the 4th paragraph.

"The proportion of commercial sex infections among male cases increases with age (approximately 30.0% in the 15-19 age group and 65.0% to 67.0% in the ≥60 age group)[21]" in the 4th paragraph.

Methods

Please have a separate section for the following parts in the method section

- Study process - explain including the consent process
- Ethical clearance

- "Study process" as a separate section is added in the method section now.

"Ethical considerations" as a separate section is added in the method section now.

Result

- In the result section, only mention one main result from a variable, leave the rest of the result for the table, otherwise, the relevance of the table will diminish. For example, for marital status or educational status mention only one main result

- Now, we only mention one main result from a variable in the text, and delete the rest of the results.

- When you mention the regression results please only mention the result and delete all of your texts after 'Versus'. For example, you say "those who had engaged in commercial sex with young clients versus those who did not". Delete the statement after versus and do this for all, because the first is explanatory by itself.

- Now we delete the statement after all "versus" to make the text concise.

- In addition, mention the odd ratio numbers for the multivariate analysis only; for univariate analysis

part only mention the name of the variables which become significantly associated. It looks vast and makes it not interesting to read.

- Now we only mention the odd ratio number for the multivariate analysis. The odd ratio numbers in the univariate analysis part are deleted.

#### Discussion

- Under discussion line 8 you mention that "Low-tier FSWs had low sociodemographic level". Please rephrase the sentence, the word 'low' might not explain all sociodemographic variables for example what is low for age??

- The sentence "Low-tier FSWs had low sociodemographic level" now is revised into "Low-tier FSWs have a low socioeconomic status".

#### Conclusion

- You stated that "Low-tier FSWs who engaged in commercial sex with OMCs were more vulnerable to HIV infection/STIs than those who didn't engage in this behavior"; but you did not conduct HIV testing and you did not use their HIV status to see whether low-tier FSWs are more HIV positive. Therefore do not conclude on the data that you did not collect. Your conclusion should only base on your results.

My suggestion "Low-tier FSWs who engaged in commercial sex with OMCs reported more risky sexual behavior.

- Many thanks for reviewer's suggestion. The sentence "Low-tier FSWs who engaged in commercial sex with OMCs were more vulnerable to HIV infection/STIs than those who didn't engage in this behavior" now is revised into "Low-tier FSWs who engaged in commercial sex with OMCs reported more risky behaviors than those who did not engage in this behavior".

#### Reviewer: 3

Dr. Allen Furr, Auburn University

#### Comments to the Author:

Thank you for submitting this paper to the Journal. It addresses an important public health area, and its findings should be relevant to program planners working in HIV/AIDS prevention.

I have a few suggestions and recommendations to make your paper stronger. I will list them below in no specific order.

1. The paper requires careful editing and rewriting. There are numerous typos, misspellings, awkward sentences, verb tense errors, and wrong words. For example, the sentence "The participants were recruited voluntarily", I believe, is meant to say that individuals participated voluntarily. But literally it states that they were recruited voluntarily, which, of course, is a different meaning. The words "exhibited" and "propaganda" were used incorrectly. In addition, the paper is rife with redundancies. It may be that different contributors wrote different sections of the paper without coordinating their efforts; at least, that's how the paper sometimes reads. As further example of that, some spellings and phrasing switch between American and British English (e.g. "behavior" and "behaviour". These problems make the paper's substance hard to follow at times.

- The English in this document has been checked by at least two professional editors, both native speakers of English. For a certificate, please see:

<http://www.textcheck.com/certificate/AN7HH0>

2. There are a few places in which textual references are unclear. On page 1 of the manuscript, "FSWs in China are classified (sic) as high....". Classified by whom and for what purpose? How are the classifications measured? In the same paragraph: "Low-tier FSWs always have less understanding...." "Always" is an empirical term and requires specification. "Less understanding" is comparative and requires a reference: less than whom or what?

- Now the sentence "FSWs in China are classified as high-, middle-, and low-tier according to the

price of sex transactions, and work venue; low-tier FSWs charge low fees for each sexual service, usually work on the street, or in small or hidden venues such as hair salons, rental rooms, small hotels and so on" is revised into "FSWs in China are classified as high-, middle-, or low-tier according to the venues they work in. Low-tier FSWs are defined as those who work in smaller and hidden venues, such as hair salons, rental accommodations, small hotels and so on, or on the street". The literatures for classification of FSWs is cited. This classification is to identify different HIV/STI risks related to different type of FSWs. This is also explained in the later part of this paragraph. "always" is deleted now, and the whole sentence is revised into "Low-tier FSWs have less understanding of HIV and STI than middle- and high-tier FSWs".

3. Page 2 of the text: the use of the word "elderly". I'm not sure many would agree that age 50 is considered elderly, unless it is a China-specific designation. If so, that should be clarified.

- The word "elderly" here are changed into "older".

4. There is a disconnect between variables listed in the text and those in the tables. In addition, the variables listed in the text are not adequately operationalized. For example, age of client is divided in ordinal groups in Table 2: "young" and "middleaged (sic)". The study is about older clients. No rules have been provided to specify these divisions. In fact, age of client is not listed as a variable in the methods section. Other variables are similarly not specified. There is no operationalization of perception of HIV risk. Were the participants questioned about their perception or their behavior? That distinction is not clear. Or is the variable actually about the researchers' perception or assessment of risk? Clarity is needed here.

- In the questionnaire of this study, we asked the participants "Have you ever engaged in sex with young clients", "Have you ever engaged in sex with middle-aged clients", the possible responses are "Yes" or "No". In this analysis, we used the two variables as independent variables to examine whether the low-tier FSW who engaged in sex with old male clients are more or less likely to engage in sex with young or middle-aged clients. The variables for age of clients now are listed in the method section and explained.

For HIV risk perception, this words are revised into "Risk perception of HIV infection". Actually, in the questionnaire, we asked "Do you think that you are possible to be infected with HIV", the response are "Impossible", "Possible", "Unsure". Variable for STI Risk perception is the same.

- The self-efficacy regarding condom use measure is unclear. Three questions were asked, each having three possible responses. However, the range of scores is reported as 0-3. Since no values were assigned to the variable attributes, how these scores were calculated cannot be replicated.

- "The response options were "I can," "I can't," and "I'm not sure." "I can" responses were assigned 1 point, and "I can't" and "I'm not sure" responses were assigned 0 points." is added in the method section now, to make the statement clear.

- Relatedly, how did participants determine the age of their clients? They reported their judgement of clients' age, but were there any determining factors they used? This might be of some importance regarding reliability of this measure.

- In this study, there are 3 questions involved in the age category of participants' clients, "Have ever engaged in sex with old clients in the previous month?", "Have ever engaged in sex with middle-aged clients in the previous month?", "Have ever engaged in sex with young clients in the previous month?", the possible responses are "Yes", "No".

Regarding these 3 questions, we just ask low-tier FSWs to report age category of their clients in the previous month by judgement, namely, whether or not their partner are "old", "middle-aged", and "young", which may result in problems for the reliability of these measures. However, we think that the participants' judgments might be credible because they just respond to an age category of their clients. For example, as long as a participant believed that she had sex with an old client in the previous month, she would report such experience, and be classified into a group that had sex with

old clients; this had nothing to do with the number of her old clients. So is their relationship with middle-aged and young clients in the previous month.

We added this limitation and relevant discussion in "limitation" part of discussion section.

- In the list of variables on page 4 of the manuscript, "factors related to sexual behavior" is listed. This requires specification. The table presents different sexual acts: is that what "factors" means? Please clarify this.

- "factors related to sexual behavior" now is deleted, all independent variables are detailed in "Measure" part of the method section.

- HIV/STI symptoms are assessed statistically, but are not listed in the methods section of the paper. In short, there should be consistency between the text and the tables, and each variable should be defined and operationalized.

- STI related symptoms as a variable now are listed and explained in the method section. Now, all independent variables are listed in the method section.

5. Page 5 of the manuscript. The phrase "in order to adjust for possible confounding" needs elaboration. It is offered as a justification for the multivariate analysis, but the paper would benefit from a stronger and more detailed argument for this analysis. The goal of the paper was to "explore the correlates related to low-tier FSWs who engage in this specific behavior...." This statement does not necessarily imply the use of a more powerful and causal analysis. It may be the odds ratios are important, and they are, but the use of this technique should be explained to give the reader a greater understanding of what the odds ratios are saying.

- "in order to adjust for possible confounding" is deleted now. For detailed revision, please see the "Statistical analysis" part of method section.

6. I recommend elaborating on the sampling, if possible. All that is said is that "trained staff" from a public health center "reached out". Is there anything that should be known about how these women were recruited? This is a judgmental sample, which is ok, but what criteria were used to select these particular women? How did the health staff know them?

- Now "Study process" (representing "Sampling methods") is a separate part in the method section. We revise related part, make it more detailed and clear. The detailed revision see "Study process" of the manuscript.

7. The text should contain references to the tables.

- "Table 2", "Table 3" are added to related parts of the result section.

8. Page 9 of the manuscript -- How are high, middle and low tier sex workers defined? It is income, but what method divides them? For example, are they divided into thirds?

That low-tier workers earn less money is self-evident and by definition and not necessary to mention, as done in the text.

- Many thanks for reviewer's comments. We now revised the beginning parts of second paragraph of the introduction, to explain how are high, middle and low tier FSWs are defined.

The sentence that low-tier FSWs charge low fees for each sexual service is deleted now.

9. Page 12 of manuscript -- I'm not sure how causality is affected by a cross-sectional design. That is not evident on face value and should be explained. The actual problem with making inferences is that the sample is not random but judgmental or convenient.

- This study is cross-sectional, and the sample is not random. However, we think that the sample is still reasonably representative, as this study was conducted in 21 counties of all 11 prefectures of Zhejiang province, and the research subjects were all low-tier FSWs in various venues of these areas, and the investigators are staff from local CDCs who engaged in behavioural intervention on FSWs,



and familiar with FSWs community in each study area and furthermore, a pilot survey to confirm the location of low-tier FSWs in these 21 counties was conducted, to ensure that all low-tier venues could be approached. Finally, the sample size is relatively big.

The above description is placed in the limitation part of the “Discuss” section.

10. Typically new data/results are not presented in the discussion section. For example, on page 11 of the text, contraception methods are mentioned for the first time; plus, they are not listed as a variable in the methods section. Usually, the discussion section begins with a short summary of the major findings, and the rest of this part of the paper is dedicated to explaining the findings theoretically and/or discussing their relevance for policy, planning, or clinical practice. I recommend re-writing this section to remove new findings, incorporating them into a more parsimonious results section, and making the implications of your data more clear.

- Now contraception methods as a variable are listed and explained in the methods section. “such as intrauterine devices, tubal ligation, and the Norplant method” is removed from the 7th paragraph in discussion section. There is no new data or results presented in the discussion section now.

### VERSION 2 – REVIEW

<b>REVIEWER</b>	Amogne, Minilik Lunds Universitet, social medicin and global health
<b>REVIEW RETURNED</b>	22-Jul-2021
<b>GENERAL COMMENTS</b>	All the comments and suggestions given are considered. I have no more comment