Author's response to reviews

Title: Work-related pesticide poisoning among farmers in two villages of Southern China: a cross-sectional survey

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Author's response to reviews: see over
Responses to Reviewers’ Comments

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Thank to Reviewers and Editors for their suggestions which have allowed us to improve this manuscript. Below is a point by point response to the reviewer concerns.

Reviewer 1’s Comments

Major Compulsory Revisions:
1. INTRODUCTION:
   1-1 In introduction, It better for the author if the WHO definition of poisoning mentioned mainly in the first paragraph of the introduction (Thundiyil JG., et al.,2008).

   **Response:** Thank you for your wonderful suggestion. We added this paper as an important reference. We also modified the acute pesticide poisoning case definition using the WHO case definition matrix as a guide (Thundiyil JG, et al., 2008). An acute pesticide poisoning case is now defined as any pesticide applicator who self-reported two or more of the 66 listed subjective symptoms in the 24 hours after applying pesticides. Changing the definition reduced number of cases from 87 to 80 in our study. However, the association between the composite exposure risk behavior scores and the risk of acute pesticide poisoning became stronger. We re-did the data analysis adopting the new definition and updated the results and tables accordingly.

   1-2 In introduction in 1st, paragraph, line 2, author mentioned the annual poisoning cases in developing countries of Asia. It will be better if the author can mention it through world-wide.

   **Response:** As you suggested, we had added a reference related which estimated number of pesticide poisonings worldwide.

2. METHODS:
1. Study design and sampling:

2-1-1: The author mentioned in the first sentence "convenience sampling.\textquotedbl", what "convenience" mean here?

**Response:** We deleted this term. In addition, we added several sentences to clarify our survey methods.

2-1-2: The sampling procedure is not clear, how was the 910 participants were selected? And why not more or less this number, could the author show how this sample size had been calculated and were selected?

**Response:** As suggested, we added sentences about the sample size calculation. The following sentences were added:

“Based on the anticipated prevalence of acute pesticides poisonings among Chinese farmers of 10%, a total of 864 pesticides applicators from two villages are needed to achieve a study power of 80% and an alpha of 5%. Using the population census data from the local government office, two villages with a total of estimated of 1000 adult farmers were chosen for our study.”

2-1-3: In second paragraph, the second sentence, the author mentioned that the questionnaire was pretested (pilotted): How this piloting was performed, by whom and how many persons interviewed and when (the exact date or period). Also did the persons who participated in piloting were re-interviewed in the formal study?

**Response:** As suggested, we added sentences to clarify the questionnaire’s pilot testing procedures.

2-1-4: What kind of help given by the village leader in data collection phase?

**Response:** In our study, the village leaders first served as guides to locate applicators because the investigators were not acquainted with the local residents. Second, local residents speak dialects, so the leaders assisted with communication when it is necessary. We added clarifying text to the manuscript.

2 Statistical analysis:

Could the authors give some results if other statistical analysis rather than Odd Ratio to find the association was used. If yes is there any differences in associations by using other statistical analysis rather than OR test. I recommend the author to re-analyse the data to give more clear findings mainly among both males and females. I know this is not comparative study between male and female, but the findings should be more clear for readers.
Response: We believe the $\chi^2$-test and logistic regression models are proper statistical methods for our study. We agree that it may be desirable to conduct all data analyses separately for males and females. However, our sample’s small size limits the statistical power of gender specific analyses. We believe the major findings and major conclusions (strong associations between safety education, the composite pesticides exposure scores and acute pesticide poisoning) perhaps explain the higher prevalence among women.

3. RESULTS
3-1. In the sixth paragraph of the Results mainly the 2nd sentence: author mentioned "after controlling for other variables" what were these variables? Also the same in the 3rd sentence of the same paragraph.

Response: Logistic analysis allows us to examine an association while controlling for the effects of all other potential covariates (listed in table 5). For example, we adjusted for the effects of gender, age, education, study areas and safety knowledge when we reported the association between pesticide poisonings and the behavioral risk scores.

3-2 Results presented in tables:
The study sample composed of males and females (females consisted of about one third of the total sample size), could the author present results for both genders. Different characteristics of male and females could play a role in receiving symptoms. As an example in table 1, age mentioned is it for male or females? It seems for the total of 910. Results should be for both, also as in education. Also for table 2, it will be better if the author show us the distribution of these symptoms among both males and females. This should be applied for all tables.

Response: We agree with the reviewer that that it may be desirable to conduct all data analyses separately for males and females. However, if we do the separate analyses, we would have to report quite a few small numbers (i.e. less than 5) in tabulated cells due to our small sample size. Gender specific analyses will significantly reduce the power of the statistical comparisons and make for uncertain interpretations.

3-3 from table 4 it seems that the number not equal to 910, was there missing cases, if so the author should mention this in the table footnote.

Response: We have added a footnote to table 4 indicating not all respondents completed all questions regarding safety knowledge, application methods, and personal protective behaviors. Additionally, there was a ‘Don’t know’ category, not counted as a ‘No’ or ‘Yes.’

3-4 In table 5: First, the author should think more about the reference groups, how it was selected as a reference group such as: why elementary schools not high school
or more…..etc for all variables presented in this table. The reference group used to be the normal status or closed to normal such as 65+ age group more affected by pesticide exposure than the young one?!.....the normal thing is to find less symptoms among highly educated rather than less educated.....?, or more explanation and rational needed to explain why using like these references groups.

Response: The reviewer raised a good point. For each variable, we should choose the reference group based on the lowest percentage of pesticide poisoning. Results for all variables except for “education” were presented in this way. We have revised our analysis and the subgroups with the “middle school” (the lowest percentage of pesticide poisoning, 7.9%) chosen as the reference for education. We have updated table 5 and the results section accordingly.

3-5. Personal Protective Equipment used should be presented in a separate table by both males and females. If the data available, it will be more interesting if the author present some findings on the PPE used and the association of using these PPE with distribution and prevalence of poisoning.

Response: We did evaluate the association between using personal protective equipment (including disposable masks, safety clothing, latex gloves, rubber gas masks, handkerchiefs/headscarves/hard hats, boots, long sleeves and safety goggles) with the distribution and prevalence of poisoning. Overall, lack of use of PPE was significantly associated with prevalence of pesticide poisoning ($p=0.01$, shown in table 4). We also included the use of personal protective equipment in the behavioral risk score calculation (table 5). However, due to the size of our study, we were not able to test the relationship between pesticide poisonings with each type of personal protective equipment.

4. DISCUSSION
It seems that the discussion part goes with the results and findings of the study. According to validity, it was mentioned by the author and this is very good, but it is strange to say that according to costs, the study was unable to collect data on types of pesticides used by agricultural workers, intensity and duration. I think like these data should be included in the questionnaire and should be answered by participants at the same interview by which they answered questions on poisonings.

Response: We did have questions ask about the types of pesticide, but it was only asked among the 124 applicators who self-reported any listed symptom. We added the results of types of pesticide in our revised manuscript. However, we did not have information about the duration and intensity of pesticide application. We acknowledged this limitation in the discussion text.

Minor Revisions:
1. Main manuscript: Introduction:
1-1. It seems that introduction consists of two paragraphs, could the author split the first paragraph (it is long in its current format) for more clearer for readers.
1-2. The last paragraph of the introduction could be as a separate paragraph starting with "the aims of this study....".

Response: We made substantial changes in the revised manuscript as you suggested. We re-organized the Background section to 4 paragraphs with the last paragraph stating our study aims.

2. Methods:
   2-1. Could the author replace the word "determine" by the word "investigate" in the last sentence of the second paragraph in the study design and sampling section.

Response: We made the change as you suggested.

3. Results:
   3-1: In the footnote of table 5, it is mentioned "Adjusted odds ratio..". Could the author mention adjusted for what variables.

Response: In multivariate logistic regression models, each AOR is adjusted for all other variables in the model (variables listed in the table 5). For example, the AOR for the behavioral risk score was adjusted for gender, age group, education, area, and safety knowledge.

3-2: If the data available, could the author present what are the common types of pesticides applied by participants and the percentage of participants for each type or family like insecticides …no%, herbicides…no%....etc.

Discretionary Revisions
Could the author give a foot-note for the figure to be more clear and more explained.

Response: The 124 pesticide applicators, who reported any symptoms after applying pesticide, were asked about the type of pesticide used. Among 80 pesticide poisoning cases, 74(92.5%) reported contacted with insecticides before symptoms occurred. Other types of pesticides included herbicides (2.5%) and bactericides (5%). We added these results to revised manuscript. As you suggested, we have added footnotes to each table to make them clearer. The title of the figure is also mentioned at the end of the text but is now also restated with the figure.

Reviewer 2's Comments:

Major Compulsory revisions
The article may be suitably condensed to words ranging from 1,000 to 1,500.
Response: We appreciated this comment. Being concise is what we all shall strive for in writing scientific papers. During the revision, we condensed the text substantially, especially the Background section. The current word count of main text is less than 3000 words, which is typical of an original research paper. If we condense this original research article to 1000-1500 words, many of the important elements of the study (and study details requested by another reviewer) would be lost.

Minor Essential revisions
The following corrections are recommended
1) Table 1: The P values for variations in demographic characters is not necessary.

Response: We could leave out the P values, but we think presenting P values can help readers to understand the differences in demographic information between two areas.

2) The Univariate analysis Multivariable Risk Ratios may be incorporated directly into the respective tables in Table 5 and Table 1, Table 3 and Table 4 respectively.
3) Table 5 not necessary.
4) Table 1 and Table 3 can be merged into a single Table 1.

Response: We agree that we could incorporate our results in fewer tables or even leave out one or two tables. However, if we were to do so, we feel we will make tables complicated and hard for readers to read and interpret.

5) The number of References may be reduced to 15-20.

Response: We significantly revised our manuscript. The number of references was reduced to 23 in the revised manuscript.

6) The scale used to score the self assessment questionnaire has not been mentioned. Please mention the scale used to evaluate the self assessment scores.

Response: The scale used for safety knowledge and pesticide exposure risk behaviors was added as suggested. We also calculated an overall composite risk score for each farmer based on the number of reported risk behaviors. The final composite risk score was generated using nine questions.

Discretionary Revisions
1) It is recommended that the authors may classify the symptoms based on severity and causality using WHO standards.

Response: Thank you for your suggestion. We did choose to utilize the WHO case
definition matrix. Details are in the response to reviewer 1’s first comment.

2) Please mention whether any of the observed symptoms were life threatening or even lethal.

**Response:** In our study, the most common symptoms reported by applicators were dermal symptoms (106 cases, 11.6%), followed by nervous system symptoms (97 cases, 10.7%). The symptoms of respiratory system (16 cases, 1.8%) or cardiovascular system (3 cases, 0.3%) were rare but perhaps more severe. We added one sentence indicating none of these symptoms was lethal.

3) It is recommended to mention the mortality rates associated with work-related pesticide poisoning in the introduction or in the discussion.

**Response:** We appreciate this comment. We could not find a reliable source of mortality rates associated with work-related pesticide poisoning worldwide. The focus of our paper is on nonfatal pesticide poisoning.

4) There is no mention of carry home pesticides. I recommend that authors highlight the importance of carry pesticide residues in their clothes or skin.

**Response:** We added to the Discussion a sentence about residue on clothing and skin being carried into the home.