Author's response to reviews

Title: Regional differences in diabetes prevalence and awareness between coastal and interior provinces in China: a population-based cross-sectional study

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Author's response to reviews: see over
Dear Mr Victorino Silvestre

Thank you very much for your comments and suggestions.

We have revised the manuscript, according to the comments and suggestions of reviewers and editor, and responded, point by point to, the comments as listed below.

The revised manuscript has been edited and proofread by a fluent English speaking person with scientific expertise from a language company named Medjaden Bioscience.

I would like to re-submit this revised manuscript to *BMC public health*, and hope it is acceptable for publication in the journal.

Looking forward to hearing from you soon.

With kindest regards,

Yours Sincerely

Prof. Qiuhe Ji
Replies to Reviewers and Editor

First of all, we thank both reviewers and editor for their positive and constructive comments and suggestions.

Replies to Reviewer Feng Ning:

Methods:
1. As show in some collaborative studies, waist circumference is more strongly associated with diabetes than BMI, do you have waist measurements in your data. In addition, income level and occupation was also needed to be control in the multivariate model.

   Answer: Thank you very much for you suggestion. We had waist measurements in our data. We totally accept your comment and define central obesity by waist circumference as a covariate instead of BMI in the multivariate model. We also controlled family income level in the multivariate model. However, personal income level and occupation was lacked and we had elucidated it as limitation in the discussion.

2. Please define the OR in the statistical analysis part.

   Answer: I have defined the OR in the statistical analysis part.

Results:
1. Given that this is all presented in table 1 it is not necessary to describe every difference. I would suggest important differences are picked out.

   Answer: I have accepted your suggestion and modified the description of table 1.

2. Please modify the serial number of tables in the table part.

   Answer: I have modified the serial number of tables in the table part.

3. On the second paragraph of this section, the rate of diabetes awareness is not statistically significance in female not in male between the two provinces.

   Answer: I have corrected it.

4. The contribution of the college education and cigarette smoking is unexpected in Fujian and Shaanxi, respectively. The performance of education is substantially different between urban and rural areas in previous reports, particularly in China. Can you give the sex- and urban-rural specific multivariate model for diabetes prevalence? Additionally, family income or personal income also needs to be considered in the
model. If not available, should state as limited part in the discussion.

**Answer:** Thanks for the valuable suggestion. Certainly, it’s better to show an urban-rural specific multivariate model for diabetes prevalence considering that Yang had reported the diabetes prevalence in urban was higher than that in rural in China*. However, the difference between urban and rural is contributed mostly by the performance of education, level of income, distribution of demography or something else. In another word, urban-rural has multicollinearity with some covariates such as education and income level, which were actually considered in our model. The best way to avoid multicollinearity is to analyze by subgroups. But we finally gave up because our sample of rural (523 in Fujian) seemed insufficient for subgroup analysis and we stated in limitations.


5. Age difference need to be considered in the diabetes awareness, have you add to the final model as categories variable instead of continuous one, for example age < 50 and age >=50? In addition, I wonder the BMI as a continuous variable included in the multivariable model.

**Answer:** Age difference, categorized as 20-40, 40-60 and above 60 years, and BMI, categorized as below 25, 25-30, above 30 kg/m2, were both included as categories variables in the multivariable model in the diabetes awareness. And we finally included waist circumference to define central obesity instead of BMI as you suggested.

6. Please give the result of the chi-squared log-likelihood ratio test on the table 5, BMI, to show the magnitude of the model when metabolic risk factors and family history of diabetes were further adjusted.

**Answer:** I have added the results of the chi-squared log-likelihood ratio test as you suggested.

**Discussion**

1. The DNS is a cross-sectional study, you should clarify the limitation of design fault in disease causality in the discussion part.

**Answer:** I really appreciate your advice and have add it in the discussion part.

2. If no info on income and occupation related physical activity was available in the current data analysis, you should state them.

**Answer:** I have stated them.
Replies to Reviewer Hang Li:

Major Compulsory Revisions
1. Some contents regarding the importance of diabetes awareness can be added in background part.  
Answer: I appreciate your suggestion and have added some contents regarding the importance of diabetes awareness in background part.

2. Why choose these two provinces, rather than other provinces as the represents of the coastal cities and interior cities?
Answer: It's a very good question. First, Fujian Provincial Hospital, which locates in Fujian, and the First Affiliated Hospital of Fourth Military Medical University from Shaanxi province have a very good collaboration both in clinic and research work with history. The strong interests that both we have in the regional difference of diabetes prevalence promote this study. Secondly, each province is very representative in the corresponding region in China. For example, people lived in Fujian province have a totally different lifestyle habit to the counterpart from Shaanxi province, which located in the center of China geographically with distinct social and natural customs.

3. Now that the authors wrote the data were part of DNS in study population in Methods part, some compression and modification can be made in “data collection” part.
Answer: I have accepted your suggestion and made some compression and modification in “data collection” part.

Minor Essential Revisions
1. In "limitation", the authors wrote "there was a lower response rate in men than in women”, maybe some content of the response rate can be narrated in “methods” part.
Answer: I thank you for the valuable suggestion. The limitation of lower response rate in men than in women does not lied only in our study but in the whole DNS. We therefore narrated it in our limitation part.

2. The writing language can be improved better, for example, the “And” at the beginning of some sentences.
Answer: The writing language has been edited and proofread by a fluent English speaking friend in the language company named Medjaden Bioscience Limited.

3. The consistency of references forms should be improved. (i.g. “Diabetes Res Clin Pract” and “Diabetes Research and Clinical Practice”)
Answer: I have improved the consistency of references forms.

Discretionary Revisions
In first paragraph among “study population”, the data of “ones who had any of missing information” were excluded. Is there any other way to maximize the utilization of the data?

Answer: I do feel it is better to maximize the utilization of the data as you suggested. The prior reason we excluded the ones who had any of missing information was that we intended to make consistency with Yang’s study about DNS*, in which the participants of Fujian and Shaanxi were same with ours.

Replies to Editor:

1. Copyediting.
   Answer: The writing language has been edited and proofread by a fluent English speaking friend in the language company named Medjaden Bioscience Limited.

2. Please document within the methods section of your manuscript the specific name of the organization that granted ethical approval to your study going ahead.
   Answer: I have documented the specific name of the organization that granted ethical approval to the study with the methods section as you suggested.

3. Please provide a Conclusions heading/section before the Competing Interest.
   Answer: I have provided a Conclusions heading before the Competing Interest.