Author’s response to reviews

Title: Application of three statistical models for predicting the risk of diabetes

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Version: 2 Date: 15 Oct 2019

Author’s response to reviews:

Dear Reviewer,

Thank you very much for your efforts to review our manuscript, and especially for your deep insight, detailed comments and explanations. We tried our best to answer your questions and made revisions clearly. Please let us know if you have any more comments or suggestions.

Reviewer’s comment:
  Abstract
  Our response:
  Thank you for this comment. We have modified the inappropriate words.

Reviewer’s comment:
  Background
  1. In your sentence, “At present, the proportion of the potential population with diabetes in Chinese adults is as high as 15.5%, and 60.7% of these individuals had not previously received a diagnosis of prediabetes s [4]” the final phrase is unclear. When you say 60.7% do not receive the education as early as possible without a prior diagnosis, do you mean that they had not previously received a diagnosis of prediabetes? Please revise this portion for clarity.
  Our response:
  Thank you for your careful reading of our manuscript and sorry for the confusion. We have modified the unclear part.
Reviewer’s comment:
2. Line 13 – “Diabetes complications can be avoided…” – This is not completely correct. There are genetic factors at play in attention to how well their diabetes is controlled. Maybe state that “in some cases, diabetes complications can be avoided when a person with diabetes is diagnosed early, treated and maintains tight control of their blood sugar levels.”
Our response:
Thank you for this comment. We have modified the incorrect part based on your opinion.

Reviewer’s comment:
3. Line 32 – Remove etc.
Our response:
We have removed etc according to your opinion.

Reviewer’s comment:
Method
1. Line 30: Why were individuals with diagnosed type 2 diabetes excluded?
Our response:
Because people who have been diagnosed with type 2 diabetes in the past have been treated or changed their lifestyles, BMI, waist circumference, TG, etc. may have changed, which will affect the results of the study, so we excluded these people.

Reviewer’s comment:
2.Line 31: State “of which 4177 met the inclusion criteria.”
Our response:
In our study, a total of 4,689 samples were investigated, and samples that did not meet the criteria were excluded according to the exclusion criteria. Finally, 4177 samples met the criteria for inclusion in the study. We have modified the unclear part.

Reviewer’s comment:
3.Line 48: What does it mean when waist circumference was measured with 1 cm in width?
Our response:
This 1cm is the width of the measuring tool. The measuring tool is 1.5 m in length and 1 cm in width. The expression is misleading and has been deleted.

Reviewer’s comment:
4.Line 18: This sentence is confusing. “The participants were not diagnosed with dyslipidemia and were not taking lipid-lowering drugs.” What was the criteria for dyslipidemia?
Our response:
Thank you for this comment. First, I’d like to apologize for our unclear expression. Some of our previous descriptions are not comprehensive enough to cause your misunderstanding. After checking the data, we mean that in people who have not been diagnosed with dyslipidemia and who have not taken lipid-lowering drugs, we judged dyslipidemia according to laboratory testing standards. In people who have been diagnosed with dyslipidemia in the past, we asked them to answer the supplementary question in the questionnaire, which one of the high triglycerides, high cholesterol, high LDL-c or low HDL-c is diagnosed ( If there are multiple indicators of one sample diagnosed as abnormal, it would be included in multiple variables ) This group of people,
regardless of whether or not they took lipid-lowering drugs, was included in the variables according to their self-reported abnormal indicators.

Reviewer’s comment:
5. Did you consider using a stratified training and testing set? What percentage of people with type 2 diabetes fell in each set?
Our response:
Thank you for this comment. We used a stratified training and testing set in the logistic regression model and the decision tree model, and 274 (9.37%) and 115 (9.18%) people with type 2 diabetes fell in each set. We used a training, testing and validation set in the BP neural network model, we extract 1/3 from the training set as the testing set, 193 (9.47%) and 81 (9.24%) people with type 2 diabetes fell in training set and testing set.

Reviewer’s comment:
6. Line 29: Verify was spelled incorrectly.
Our response:
We have fixed the misspelling.

Reviewer’s comment:
Result
1. In this sentence, “Substituting the prediction model into the original data, with a critical value of 0.5, the results show that the prediction accuracy of the model was 90.8% and the area under the ROC curve was 0.711 (95% CI: 0.697-0.725).” Should it say substituting into the testing data set?
Our response:
Thank you for this comment. The expression here is unclear and has been modified in the text.

Reviewer’s comment:
2. You have a large portion on training the hyperparameters of the NN model. Did you consider separating into a training, testing and validation set? Please describe your reasoning to me and in the manuscript for why you did not do so.
Our response:
Thank you for this comment. Based on your opinion, we divide the samples in the NN model into training, testing and validation set. We have modified in the text.

Reviewer’s comment:
3. In your model comparison section, did you complete 3 t-tests? Why not use ANOVA and Tukey’s HSD to reduce the risk of type 1 errors. If you did so, please specify.
Our response:
Thank you for this comment. Since the AUC comparisons we made were not able to make multiple comparisons, we did not compare the three models as a whole, but simply compared the different AUCs in pairs, so we chose the Z test.
The following literature also uses the Z test to compare three models.
Reviewer’s comment:
Previous Comments &amp; Responses:
1. “The height measurement tool used in this study has a range of 2 m, and the weight measurement tool has a range of 150 kg. The results show that there was no case outside the range.”
   a. If there were no measurements outside the range, it may be clearer to remove these maximum values. The accuracies of the measurement tools are likely sufficient alone.
   Our response:
   Thank you for this comment. We removed these maximum values in this section.