Author’s response to reviews

Title: Resting heart rate and impaired glucose regulation in Chinese middle-aged and elderly people: a cross-sectional analysis

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Author’s response to reviews:

Dear Editor:

Our manuscript has been extensively revised in accordance with the enclosed reviewer’s comments. All changes in manuscripts emphasized by red characters.
Reviewer reports:

Stefan Söderberg (Reviewer 1): The paper "Resting heart rate and impaired glucose regulation…" by Yang and colleagues is interesting not least due to the size of the studied population.

However, there are some issues that must be addressed, which are listed here, not in order of importance but of occurrence.

1. This is a cross-sectional study and the authors should avoid wording like predictors etc. or that ROHR is an independent risk factor for reduced glucose tolerance. The causality cannot be determined from this study, as diabetes and concomitant polyneuropathy may cause the relative tachycardia. This paper describes associations, nothing else. And any speculation that treatment of pulse rate should reduce the risk of diabetes is speculative. For example, see the last sentence in the results section and the conclusion, rephrase!

Answers:

We sincerely appreciate reviewer’s constructive comments. As reviewer’s comments, the causality cannot be determined from this study, as other potential factors may cause the relative tachycardia. This paper describes associations, nothing else. And any speculation that treatment of pulse rate should reduce the risk of diabetes is speculative. According to reviewer’s instruction, we have rephrased it in the manuscript.

2. This is not the first study, for example the work by Grantham et al (Grantham NM, Magliano DJ, Tanamas SK, Soderberg S, Schlaich MP, Shaw JE. Higher heart rate increases risk of diabetes among men: The Australian Diabetes Obesity and Lifestyle (AusDiab) Study. Diabet Med 2013;30:421-7) demonstrated a prospective association between pulse rate and development of diabetes.

Answers:

3. The manuscript needs a careful language revision by an English native speaker.

Answers:

We thank reviewer for valuable comments. As reviewer’s advice, the manuscript have been revised by native speaker.

4. Abbreviations are explained in the abstract but not in the background and onwards, should be repeated there.

Answers:

We thanks for reviewer’s reminder. According to reviewer’s instruction, we have revised this part in the manuscript.

5. Why was not the HbA1c results used to define diabetes as suggested by modern criteria?

Answers:

We are sincerely appreciative of reviewer’s insightful and thought-provoking comments. According to ADA criteria, if the HbA1c assay by HPLC method, the HbA1c results can be used to define diabetes. However, in this study, the HbA1c assay by enzyme method.

6. The findings of inverse relation between BMI and waist on one side and RPR is strange considering that BMI and waist are strongly associated with glucose intolerance. Any explanation?

Answers:

This is a very good question! We appreciate the insightful comments made by reviewer. As reviewer’s comments in “question 7”, the possible reason could be that the authors have not used sex specific cut-offs resulting in less males in the top quartile.

7. Could the reason be that the authors have not used sex specific cut-offs resulting in less males in the top quartile. Considering that IGT is more common in women and IFG is more common in men, this could introduce strange findings, and the test between quartiles could
be nmore at test of differences between men and women than between low and high pulse rate.

Answers:

We are sincerely appreciative of reviewer’s profound and thought-provoking comments. As reviewer’s comments, considering that IGT is more common in women and IFG is more common in men, this could introduce strange findings. According to reviewer’s instruction, we have re-analyzed the difference of clinical variables between men and women.

8. Related to that, decimals could be reduced to 1 or 0 (ex BP) in Table 1. HDL is probably the only variable usually presented with 2 decimals.

Answers:

We thanks for reviewer’s reminder. According to reviewer’s instruction, we have revised this table in the manuscript.

9. It is not stated how the difference between quartiles is tested, ANOVA??

Answers:

We thanks for reviewer’s reminder. Analysis of covariance (general linear regression model) for continuous variables was applied for the comparison according to RHR quartiles.

10. Table 4 should be provided with coding for sex, otherwise impossible to interpret the results.

Answers:

We are sincerely appreciative of reviewer’s insightful comments. According to reviewer’s suggestion, we

11. How was the pulse rate determined? ECG was recorded, but was the pulse rate based on R-R interval of one, two, three or how many intervals? How was atrial fibrillation handled with bouts of tachycardia?

Answers: We thanks for reviewer’s constructive comments. We determined the resting heart rate by ECG. The heart rate was recorded by 3 R-R interval in this study. The subject with atrial fibrillation was excluded in this study.
Weijuan Li (Reviewer 3): In this manuscript, the authors were trying to investigate the relationship between the resting heart rate and impaired glucose metabolism.

The study has several limitations:

1) This study is a cross-sectional study, and is limited by the nature of a retrospective study design. The study used a single heart rate measurement which was derived from ECG which might not represent a true resting heart rate. It would be more ideal to have multiple resting heart rate measurements and use the heart rate trend or at least an average heart rate for the analysis.

Answers:

We are sincerely appreciative of reviewer’s profound and thought-provoking comments. As reviewer’s comments, it would be more ideal to have multiple resting heart rate measurements and use the heart rate trend or at least an average heart rate for the analysis. However, due to large sample epidemiological investigation limitation, it would be more ideal to have multiple resting heart rate measurements and use the heart rate trend or at least an average heart rate for the analysis. According to reviewer’s instruction, we have added this limitation in the discussion part.

2) The authors stated that "to date, the association between resting heart rate and IGR has not yet been adequately investigated" and "To our knowledge, this is the first study to evaluate the relationship between RHR and impaired glucose regulation in a large-scale population.", this is not true. Please refer to references PMID 26002923 and PMID 27029423.

Answers:

We are sincerely appreciative of reviewer’s constructive comments. This part expression may be not rigorous. According to reviewer’s suggestion, we have changed it and added related reference.

3) The authors did not fully discuss the limitations of this study.

Answers:

We thanks for reviewer’s comment. According to reviewer’s instruction, we have added the related limitation in the discussion part.
4) There are numerous grammar mistakes in the manuscript which requires extensive editing and revision.

Answers:

We thanks for reviewer’s reminder. According to reviewer’s instruction, we have extensively revised the manuscript.