Author's response to reviews

Title: Factors associated with having less than 20 natural teeth in rural adults: A cross-sectional study

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Author's response to reviews: see over
Response to reviewers’ comments

Many thanks for your kindly comments. We have reedited and corrected the manuscript for both reviewers’ comments with red font.

For reviewer 1 comments

Thank you for your support that this study is a timely and relevant theme on oral health research. The revision was as following list:

1. Abstract- Regarding the refrain p in the abstract…
   
   Ans. Thanks for your comment. We have reduced the use of p values in the abstract.

2. Introduction –
   
   2.1. Regarding the rationale for the association between metabolic syndrome and tooth loss and what new knowledge this study adds…
   
   Ans. We have reedited and provided more information related the association between metabolic syndrome and tooth loss on p3-4 with red font.

   2.2. Regarding the including systematic review on the relationship between tooth loss and general health…
   
   Ans. We have reedited and provided more information including systematic review on the relationship between tooth loss and general health on p3-4 with red font.

   2.3. Regarding using strong studies… on p2 line 71 to 74 and p10 line 246-247…The references to support such strong statement are weak.
   
   Ans. We have reedited and using some strong studies in p3-4 with red font.

3. Method-
   
   3.1. Regarding to explain how the sample was calculated (by providing some parameter) and selected…
   
   Ans. Thanks for your comment. Because this is a community-based “census” study, it is not feasible to calculate required sample size in advance of analyzing data. We have addressed this issue in the Design, sample, and setting section (the last sentence). Please see the p8 with red font.

   3.2. Regarding all used of the instruments should be referenced or explained in detail…
3.3. Regarding the validity of self-reported number of teeth in this particular population must be informed.

*Ans.* The number of remaining teeth was counted by 8 trained research assistants not by self-reported. We have provided more detail procedures on p5 and p6 with red font.

3.4. Regarding there is no clear justification of why using t test for comparisons when the NRT is a discrete outcome variable. Have you tested the normal distribution of the outcome? It seems to me very unlikely the number of dental teeth have a normal distribution. Also it is important to justify the use of logistic regression given that the prevalence of the outcome is relatively high.

*Ans.* When comparing group difference (Table 2), we treated NRT < 20 as dichotomous independent variable. Therefore there is no normal distribution assumption for this variable. When investigating the associated factors of outcome variable (NRT < 20), we categorized the number of remaining teeth into a dichotomous variable, thus no need of normal distribution was required. We have clarified this issue and provided two citations supporting the adequacy of use of logistic regression given the outcome prevalence (16.2%) in the Statistical analysis section. Please see the p8 with red font.

3.5. The authors should explain the multivariable modelling; the criteria to enter and to keep variable in the models; and which variables (and why) were considered confounders.

*Ans.* We have extended the explanation about how we chose and kept the variables in the multivariate model and what variables were the confounders. We addressed this issue in the Statistical analysis section with red font.

4. Results –

4.1. Please refrain from repeating what the readers can see in the tables and the use of too many p values. I suggest replacing ± with 95% confidence intervals which are much more informative.

*Ans.* Thanks for your comment. We have tried our best to reduce the use of P values in the text of the results, especially about the Table 1 and Table 2.
5. Discussion-

5.1. Regarding the bidirectional association and potential temporal ambiguity between the main exposure (metabolic syndrome) and tooth loss should be discussed.

*Ans.* We have provided more detail information on p10-11 with red font.

5.2. Regarding the study’s internal validity must be addressed.

*Ans.* We have provided more detail information about the study’s internal validity on p7 with red font.

**For reviewer 2 comments**

Thank you for your support that this is an important and interesting study.

1. Regarding the author chose only using dental floss for indicator of oral hygiene? Other variables such as fluoride use are also important factor of tooth loss. You may need to justify why you chose only this variable.

*Ans.* Thank you. We have provided the reason why we only using dental floss for indicator of oral hygiene on p5-6 with red font.

2. Regarding why the author chose three variables for indicator of healthy dietary habits? This needs more detailed descriptions.

*Ans.* Thank you for this comment. We have provided more detailed descriptions with healthy dietary habits on p6 with red font.

3. Regarding at multivariate logistic analysis, "substance use" and "dietary habit" are combined three variables into one. The author should explain how combine and definition these variables.

*Ans.* We have clarified this issue in the *Statistical analysis* section with red font on p8. The extended content was as the follows: “To avoid the collinearity among similar parameters (i.e. the three variables in unhealthy dietary habit, the three variables in substance use, and the five components of MetS), we put the general variables (i.e. unhealthy dietary habit, substance use, and component number of MetS) into the multivariate analyses instead.”

4. Regarding Typos (e.g. line 97 on page 3, "type2" replace for "type 2").

*Ans.* Thank you for this comment. We have corrected on p3 with red font.