Author’s response to reviews

Title: Assessment of risk factors for early childhood caries at different ages in Shandong, China and reflections on oral health education: a cross-sectional study

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Assessment of risk factors for early childhood caries at different ages in Shandong, China and reflections on oral health education: a cross-sectional study
Meng Zhang; Xinyue Zhang; Yuan Zhang; Yanan Li; Chunchun Shao; Shijiang Xiong; Jing Lan; Zhifeng Wang.
BMC Oral Health

Dear Prof. Mohammad Reza Khami

Thank you very much for your careful review and thoughtful comments and suggestions. At the same time, we feel very sorry for the inappropriate line number marking in the previous point-by-point response letter, which was marked based on a version that does not show track changes, so you and reviewers cannot evaluate the changes accurately and clearly. We apologize for any inconvenience we’ve caused.
Therefore, the following includes two parts. Part 1 revises the line number markings in the previous point-by-point response letter based on the latest revised manuscript with track change, and part 2 is the point-by-point response letter to the latest comments. We hope that you could consider this manuscript for publication in your journal. Thank you very much!

Part 1

First, thank you very much for your comments. As you mentioned, the strength points of and renovations made to this study should be emphasized to enhance the chance of acceptance. This study is indeed a large sample size study that is part of a national epidemiological survey, and this study is the first to report the oral health status of children in Shandong Province in recent years. These are the advantages of this study, and we have added relevant content to the Introduction (line 102, page 5) and Discussion (lines 394-396, page 18) sections based on your suggestions. Again, thank you very much.

In addition, the analysis of the independent risk factors related to ECC at different ages aims to bring some insights to oral health education, which is the innovation of this research. However, it is inappropriate for the article to not provide a clear recommendation. Therefore, we would like to thank the editor for mentioning this lack. We have added a summary regarding the recommendations for oral health education in the Discussion section (lines 384-392, page 18). Regarding the grouping question, please refer to the point-to-point response to Prof. Prathip Phantumvanit.

The titles of all the tables have been revised, and the number of subjects has been marked. “Health” in Tables 1 and 2 referred to the caries-free group. However, the word "Health" was inaccurate, so the author has revised this term both in the table and in the article (Methods section, line 161, page 8). Thank you very much for your comments.

In addition, the English language of this manuscript has been submitted to AJE for improvement.

Below are detailed responses to the questions raised by each reviewer.
Hoda Bahramian (Reviewer 1): This paper has a potential to be accepted, but needs major revision i.e. some important points have to be clarified and errors have to be corrected. We would like to thank you for your review to our manuscript and your detailed comments and suggestions. Your opinions and suggestions have greatly helped us to improve our article. We have carefully revised this manuscript according to your suggestions, see the point-to-point response below for details. If some questions are still not explained clearly, please let me know. Thank you very much!

1-Please do not use long sentences, instead use simple and short ones. For example, in method and conclusion parts of abstract section, Lines 29-31 and Lines 41-45. We have revised these two parts (Abstract section, lines 29-34 and lines 48-52, pages 2-3) and other long sentences with simple and short sentences, which makes the article easier for readers to understand. Thank you for your suggestion!
2- Totally there are many grammatical errors and misspelling throughout the manuscripts and needs professional language checking. This revised manuscript has been submitted to AJE for professional language checking and improvement. Incorrect grammar and spelling have also been revised. Thank you very much!

3-What do you mean by cognition in line 39, please mention what cognition. This “cognition” refers to knowledge and attitude variables, we have revised here (Abstract section, line 45, page 3) and Lines 358-359 (Discussion section, page 17) to make article clearer.

4-For line 70 and 71 please provide reference. A suitable literature has been cited here (Background section, line 79, page 4).

5-In Line 73 the word "hospital" should be replaced with another general word like dental clinics

6-Line 76 do you mean flossing by the word gloss !!!!!

7-What do you mean by the word "forth" in line 74. Thank you very much! These incorrect spellings and expression have been revised (Background section, lines 81-82 and 84, page 4).

8-What is the sample size formula used in this study? This study is part of the 4th National Oral Health Survey, so sample size calculations are based on national data. By considering estimated caries prevalence rate (P=66.0%) (the prevalence of dental caries among 5-year-old children in the 3rd National Oral Health Survey, 2005), the design effect (deff=4.5), the significance level (α=5%), the margin of error (δ=10%), the calculating formula

\[ n = \text{deff} \left( \frac{u_{\alpha/2}}{\delta} \right)^2 p(1-p) \]

and the non-response rate (20%), a study sample of 13,392 subjects was targeted for each age groups. Then a quota allocation was made to 31 provinces across the country, requiring 36 children per age group in each kindergarten. We are very sorry that the calculation formula was not listed. We have added relevant content and reference to the article (Methods section, lines 116-124, page 6) so that readers can get relevant information. Thank you very much!

9-Beginning the sentences with numbers is incorrect in scientific writing. Please use Number in letters instead. For example, line 106, 112, 153, 162, …

We have checked the entire manuscript and revised the sentences that begin with numbers (including Methods section, lines 115, 128, page 6; Results section, lines 180-181, 184-185, 191-192, page 9). Thank you very much!

10- The sentence in Line 123, 124 should be revised. We have revised this sentence into short, simple sentences to make it easier to understand (Methods section, lines 141-146, page 7).
It should be explained in more details which indices were examined and then reported in result part.

Thank you very much for your suggestions. For children aged 3-5 years old, we only detected their caries status and did not perform a periodontal examination. Therefore, we performed a recorded inspection according to WHO standards, and we grouped the participants with dental caries (dmft) into the ECC group and those without caries into the caries-free group. Then, a statistical analysis of the differences in the prevalence rates of dental caries among the different variables was performed to obtain independent risk factors related to dental caries. We have revised the text in lines 159-161 (Methods section, page 8).

Based on the results of the chi-square tests, we have incorporated the variables that demonstrate differences and some other research-proven risk factors into the model for analysis. In this study, they are all KAP variables. We have made the relevant changes in the manuscript (Methods section, line 172, page 8).

The research plan requires two urban areas and two rural areas to be randomly selected for investigation. In the end, we obtained two urban areas, Weihai and Hedong, and two rural areas, Weifang and Pingyi. However, both the Hedong and Pingyi areas belong to Linyi city, so we reported that there are 3 cities used in the study. We have listed the city names in Appendix Table S1 and made the relevant revision in the manuscript (Result section, line 178, page 9).

Yes, (mean±standard error/standard deviation) is more scientific. However, because the dmft values of the sample in this study do not follow a normal distribution, it is more reasonable to use the median values to show the caries statuses (the median values of dental caries among children aged 3, 4 and 5 years old are 1, 2, and 3, respectively). However, for the purpose of comparison and analysis with national data and other research results, we chose to use the mean values for display. If we show the standard deviation at the same time (3-5 y: 3.15±3.845; 3 y: 2.16±3.096; 4 y: 3.21±3.966; 5 y: 4.01±4.134), then we will obtain negative values; thus, we only show the means and not the standard deviations. Of course, the display of standard deviations can make the article more scientific, so we have also made s corresponding revision in lines 182 and 184 (Results section, page 9).

Indeed, they are not consistent. The percentages shown in Table S1 refer to the caries-free rate and caries rate of a certain variable option. The sum of the values in this row is 100%. The purpose is to more intuitively show the results of the comparative analysis of the caries rate among different options for a statistically significant risk variable. The data shown in lines 194-196 of this article (Results section, page 9) refer to the percentages of different options for a variable, and the sum of this column is 100%. However, these data are not shown directly in Table S1, and we worry that this may make the table look more complicated. Of course, if it is better to show all of these data, we can display the sample numbers and percentages of all the options in the first column of the table. Thank you very much!
16-Line 167 fit is not correct. It must be pit.

17-Line 171, 172 the sentence "Analysis from perspective of …." Is incomplete. It should be join to next sentence.
Thank you very much! We have revised these incorrect spellings and punctuation (Results section, lines 196 and 202, pages 9-10).

18-Line 180 - 182 please revise the sentence according to table and make it clearer.
Thank you very much for your suggestion. We have revised this sentence as “Children who had frequent toothaches or discomfort in the past 12 months (Q12) or children who had ever visited a dentist (Q13) generally had a higher caries rate than did children who had never experienced either event (Q12: 88.1%-100.0% vs 57.1% and Q13: 81.0% vs 60.7%, respectively; P<0.001)” to make it clearer (Results section, lines 212-214, page 10).

19-Line 213, (OR: 0.28, 95% CI: 0.12-0.69) is correct for completely artificial fed within six month which the p-value is significant.
Thank you very much for your careful review! I'm also very sorry for this mistake, we have revised it (Results section, line 248, page 12).

20-Line 241 assess is correct instead of access.

21-Line 376 grant number instead of grand number.
Thank you very much! These incorrect spellings have been revised (Discussion section, lines 278 and 437, pages 13 and 30).

22-Line 313 to 320 is not clear and should be revised to support the data explained first time in result section. The text is difficult to understand for the readers.
Thank you very much for your suggestion. This section mainly introduces the problems in oral health education that can be reflected by the analysis results of this study. We apologize that we did not make this clear. We have revised the text (Discussion section, lines 353-365, page 17) to make it easier to understand.

23-All the references should be revised according to the journal style.
All the references have been revised according to the journal style. Thank you very much!

Prathip Phantumvanit (Reviewer 2): M&M should be more explanation on how the sample size of the samples in each age group were derived, this will help to power of the conclusion of the study.

This study is part of the 4th National Oral Health Survey, so sample size calculations are based on national data. By considering estimated caries prevalence rate (P=66.0%) (the prevalence of dental caries among 5-year-old children in the 3rd National Oral Health Survey, 2005), the design effect (deff=4.5), the significance level (α=5%), the margin of error (δ=10%), the calculating formula
n=deff\(^{(u_\alpha/2)\delta^2} \cdot p(1-p)

and the non-response rate (20%), a study sample of 13,392 subjects was targeted for each age groups.

Then a quota allocation was made to 31 provinces across the country, requiring 36 children per age group in each kindergarten. We are very sorry that the calculation formula was not listed. We have added relevant content and reference to the article (Methods section, lines 116-124, page 6) so that readers can get relevant information. Thank you very much!

even though the caries criteria of this study using WHO method but other caries classification such as ICDAS is more accurate especially in term of early caries lesions

Indeed, the classification criteria of ICDAS are more detailed and accurate than those of the WHO and can better reflect the severity of dental caries. However, as this study is part of a national epidemiological survey project, the purpose of which is to understand the oral health status of people of different ages across the country, the total number of samples reached 172,425. Therefore, in the early research design, to facilitate the implementation of the project, the consistency of the inspectors, and the accuracy of the survey results, it was necessary to uniformly use the simpler WHO standards for inspection records. Therefore, our study also uses the WHO standards to reflect the dental caries status of young children in Shandong Province.

since the questionnaires were important for the results and discussion of this study therefore there should be more detail on how the questionnaires were derived from the parents especially as retrospective study

To ensure the accuracy of the questionnaire content and reduce the memory bias, we required the guardian to fill out the questionnaire in a specific area of the inspection site, and any questions could be directly communicated with the staff. After the guardian completed the questionnaire, the staff checked the content of the questionnaire and verified that it did not have any missing items, abnormal items, etc. We have revised and improved this information in the text (Methods section, lines 141-146, page 7). Thank you very much for your suggestion.

there should be clarification whether the analysis of the data in each age group using the caries free subjects as control and the ECC subjects as the study group to compare the OHE questionnaires in each age group, this is important to discriminate the risk factors of the ECC and the control (caries free)

Yes, in each age group, we took the caries-free group as a control, used the caries rate as a display indicator, and analysed whether there is a difference in the caries rate between the different variables to obtain risk factors related to ECC. We apologize for not explicitly describing this process in the article and only reflecting it through the display of the caries-free group in the tables. We have revised the text regarding this process in lines 169-170 (Methods section, page 8).

Results: it's complicate to relate with the questionnaires number but rather grouping into important risk factors such as sugar intake, toothbrushing or oral hygiene, fluoride exposure, etc. I am sorry, as I do not know if I understand the meaning of this question clearly. I will answer based on my current understanding. If I did not answer this question clearly, please tell me and I will reply further.
The design of the questionnaire content in this study is relatively rich. It mainly includes 3 parts, namely, knowledge, attitude and practice of oral health care, in addition to basic personal information. Among these parts, only the part regarding the practice of oral health care involves the important risk factors mentioned by Prof. Prathip Phantumvanit, such as feeding method, sugar intake, toothbrushing, fluoride exposure, dental visits, etc. The independent risk factors related to caries obtained in this paper are also mainly obtained from these practice variables. Therefore, regrouping these behavioural variables into important risk factors may make the article more difficult to understand because their content would then be completely overlapping. Thus, in the text, we try to merge the two into a concept to highlight the importance of that concept.

In addition, using questionnaire numbers instead of the content itself to conduct analysis and discuss the results does make the article more complicated. Therefore, in the text, we try to use direct descriptions of the content, and the questionnaire number is enclosed in parentheses as auxiliary content. We hope that this will make the article clearer.

Discussion: when there was some irregular result such as toothbrushing and caries in this study there should be more explanation for the differences such as different food ingredients or behaviors which would be more reasonable to convince the readers then

As you mentioned, due to the special dietary habits of Shandong Province, food ingredients or consumption behaviours can indeed serve as an explanation for why brushing is not related to caries. We have revised the article in lines 349-351 (Discussion section, page 16). Thank you very much for your suggestion.

Part 2:

Editor Comments:

After the previous round of revision, the manuscript has improved to a stage that it is now possible to work on style rather than structure. The following style comments are several, but mostly easy to apply.

Still there are some language problems, for example lines 73, 80, 83
Thank you very much! These sentences have been revised (including Background section, lines 77, 84 and 87-88, page 4).

Abstract:

Results: Pls include the name of statistical methods, P values and confidence intervals (where applicable).
We have added statistical methods, p-values and confidence intervals where appropriate in the abstract (lines 40-43, page 2).
Line 42: Pls use “was not associated with” instead of “was not confirmed”
This sentence has been revised (lines 44-45, pages 2-3).
Line 49-50: “appropriate nutrition” instead of “food oral health practices”
Thank you very much! Here we mainly want to emphasize the supplemental training of oral health practices, so we have revised it in line 52 (page 3).

Keywords: Pls check that these are MeSH terms.
We searched for MeSH terms and revised the keywords (lines 56-57, page 3).

Backgroud
Pls provide a reference for line 97, if reports in English are available.
Few English reports on oral health status in Shandong Province. The reference added here was published in 2008 and is a study of Shanghe County, Shandong Province (line 101, page 5).
Lines 102-104: Pls move this sentence to an appropriate place in discussion section: “We hope that these data will provide guidance and evidence for improving and refining the contents of oral health education.”
We move this sentence to the lines 383-384 on page 18 (Discussion section).

Methods:
Line 112: “…of the national plan, according to the following calculating formula:”
Line 115: “Based on essential…”
I think the true word is “examiner”, not “inspector”.
We have revised these sentences and words in lines 116-117, 119 and 132-138 (pages 6-7).
Line 135: I doubt the term “mutual” is the appropriate term here.
Thank you very much! The term “mutual” is indeed inappropriate, so we changed it to “cross” to make article clearer (line 138, page 7).
Guardian means parents (and other caregivers at home) or kindergarten staff? This should be clarified. The word “caregiver” is the appropriate word. So pls revise in the whole article.
Thank you very much! We have revised this word throughout the article.

Results:
Lines 178-179: “The rates of the 3-, 4-, and 5-year-old age groups were 51.1%, 67.8%, and 73.9%, respectively”. This sentence is not clear.
We have revised this sentence to make it clearer (line 182, page 9).
Line 181: what does this sentence mean? “While 96.4% of the decayed teeth were waiting to be treated”.
In this study, 64.6% of children (n = 840) had ECC. Of these children with caries, 96.4% had decayed teeth (n=810), and the remaining 3.6% had missing or filled teeth due to caries, so these 810 children's caries remained to be treated. We have revised this sentence to make it clear (line 184-185, page 9).
Line 185: P&lt;0.001
We have revised here and some other places (lines 189 and 213-214, pages 9-10).
Line 194-197: The children of those who reported knowing that bacteria (Q22d) and sugar (Q22e) can induce caries and that pit and fissure sealing can protect teeth (Q22g) and those who
believe that teeth health is related to their own protection (Q21c), were more likely to experience ECC (P&lt;0.05).

We have revised this sentence (line 201, page 10). Thank you very much!

Line 200: “The higher frequency of…”

Line 204: Remove “unexpectedly”, since we should judge about results only in discussion part.

Line 204-211: Pls remove the percentages.

Line 217: raised? “believed”. All verbs in results part should be in past tense.

Line 223: “the cognitive status” is unclear. Maybe: “the more favourable knowledge and attitudes among parents (caregivers?) regarding bacteria…”

Line 233: included.

Line 236: remove unexpectedly.

Line 244: “positive cognition”, revise according to previous comment.

Thank you very much! We have revised these sentences (lines 204, 208, 213, 221, 227-228, 238, 241 and 249-250, pages 10-12).

Discussion:

Line 258: “The caries prevalence… were…” Pls apply in the whole Discussion part (using past tense for your findings).

Thank you very much! We have revised here (line 265, page 13) and the whole Discussion section.

Line 271: age group. Pls also provide reference.

In fact, we did not find a reference in English to report and evaluate the risk factors for dental caries in children of different ages, so we revised here to make it more accurate (line 278, page 13).

Line 311: Pls revise “study and are thus seen”.

Line 329: Pls use “some” instead of “many”.

Line 367: “… dental caries in the early stage of deciduous dentition…”

Line 368: “… while dental caries in the later stage of deciduous…”.

Thank you very much! We have revised these sentences (lines 318, 336 and 374-375, pages 15-18).

Conclusion is still long. Pls summarize.

We have revised the conclusion section to make it more streamlined (line 412-420, page 19-20).

Acknowledgment: it is better to say that “Our warmest thanks go to the …”

Thank you very much! We have revised here (line 449, page 21).

Table titles: still should be improved. For example: Distribution and statistical significance by demographic variables for ECC among a sample of 3-5 years old children in China (n=1301).

Thank you very much! We have revised the table titles.

Table 1 footnote: I could not find a, b, c in the table.

Thank you very much! In Table 1, the age variable is a statistically significant difference variable, so the data of different age groups are marked with a, b, and c to indicate the difference between the groups.

Tables 3 and 4, there are various methods for logistic regression models (enter, forward-backward, etc). It is better to mention it in the title of tables as well as in methods part.
Thank you very much! We use the backward method for logistic regression analysis. We have revised it in the title of tables and Methods section (line 170, page 8).

Reviewer reports:

Hoda Bahramian (Reviewer 1): Thank you for your corrections but still some mistakes are remained! And the text still needs revisions.
Thank you very much for your careful review and thoughtful comments and suggestions.
Line 49: What do you mean by "Food oral health practice"? Please replace "Food oral health practice" with another clear phrase.
I feel sorry about it, we have revised here (Abstract section, line 52, page 3).
Line 128-134: The word inter examiner and intra examiner reliability is more common than inter inspector or intra inspectors.
We have revised this word in the article (Methods section, lines 132-138, pages 6-7).
You have not changed the references according to the guideline. All bold types are remained and do not differ with the previous draft of manuscript.
We feel sorry about that. All the references have now been revised according to the guideline.
As the reviews are open access and can be traced by readers please mention the correct line numbers in revised manuscript after corrections. For example you corrected the line 243 in revised manuscript but you addressed the line 230. Or you corrected line 351 but you mentioned line 336. And nearly in all reply to comments, it is obvious that the line numbers are incorrect and made it difficult to check the corrections. Please check and correct all the line numbers and resubmit it. Then we could continue to review. Good luck we feel very sorry for the inappropriate line number marking in the previous point-by-point response letter, which was marked based on a version that does not show track changes, so you cannot evaluate the changes accurately and clearly. We apologize for any inconvenience we've caused. And now we have revised the line number markings in the previous point-by-point response letter based on the latest revised manuscript, please refer to the part 1. Thank you very much!