Author’s response to reviews

Title: ASSOCIATION BETWEEN MALOCCLUSION, CARIES AND ORAL HYGIENE IN CHILDREN 6 TO 12 YEARS OLD RESIDENT IN SUB-URBAN NIGERIA

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Author’s response to reviews:

(Reviewer 1): Review of the manuscript "MALOCCLUSION, CARIES AND ORAL HYGIENE IN CHILDREN 6 TO 12 YEARS OLD RESIDENT IN SUB-URBAN NIGERIA"

This is an interesting and very thoroughly reported study. I have some minor comments.

1) Even though some previously reported methods have to be omitted, I think number of participants should be in the abstract, and both N of target population and n of participants and participation rates should be reported in the methods. It is essential in interpreting the results.

   The number of participants has been included in the abstract. The participation rates has been reported.

2) Also participation rate, and whether it might have influence the results, should be discussed.

3) The authors report mean values 0.27 (0.82) throughout the manuscript, but do not report what is in the brackets. Mean (SD)?

   This has been corrected

4) p-values are usually reported with 3 decimals.

   This has been corrected

5) In tables, in column 'total' in every row there is: (100%). The tables would look better without those, and easier to read, especially since it does not bring any extra information

   The table has been corrected to make it easier to read and to delete extra information. We are grateful for the reviewer highlighting this
Reviewer 2 (Reviewer 2): PEER REVIEWER ASSESSMENTS:

REQUESTED REVISIONS:

Title
* According to STROBE guideline, the study design must be provide in the title.

THIS HAS BEEN REVISED TO REFLECT THIS. THE TITLE NOW READS AS – ASSOCIATION BETWEEN MALOCLUSION, CARIES AND ORAL HYGIENE IN CHILDREN 6 TO 12 YEARS OLD RESIDENT IN SUB-URBAN NIGERIA

Abstract
* In the Results section, it is not clear what the numbers inside the parentheses mean.

The numbers inside the parentheses are the standard deviations. Corrections have been made to reflect this as such

Background
* The introduction section is well-written and state the necessary background to understand the study.

Thanks for the positive feedback

Methods
* It is not clear how the demographical data, such as sex and age, were assessed.

This information has been included in the manuscript. line 170 the sex was determined as the biological sex of the child while the age was determined as the age as last birthday. For children less than a year old, the age was determined as the number of months after birth.

* When the data was collected? This information is not provided in the present study not in the cited articles.

The date of data collection has been included in the methodology. See line 167

* I did not understand the inclusion/exclusion criteria of the present study.

This has been included in the methodology.

* Regarding the Simplified Oral Hygiene Index and Gingival Index, it is not clear how many sites per tooth were considered in both Indexes. Was all also teeth considered?

For the Simplified Oral Hygiene Index, the labial and buccal surfaces of index teeth 8, 3, 14, 24, and lingual surfaces of 19, 30 and A, E, F, K, O and P in the primary dentition were examined
for debris and calculus indices, summation of scores gave the OHI scores. The GI was obtained by scoring four surfaces of six index teeth namely 7, 3, 12, 19, 23 and 28 in the permanent dentition, and D, G, N, Q, K, and tT in the primary dentition. This information is in the manuscript. See lines 210-226

*The cutoff points are also odd. For instance, a mean 0.1 gingival Index may not represent gingivitis at all, and a mean score of 1.0 may be gingivitis in some patients. Reference must be provided to both cutoff points. The sites with score 2 or 3 (presence of gingival bleeding) may represent a more clinical significance.

The reference for the cut-off have been included. they are cut off for the scale used for the study. See line 226

* In the calibration examiners, how many examiners were involved in the present study?

Five examiners were involved in the study.

* It is not clear how the sample was selected. In the mentioned references, a different age range is cited, which may not be appropriated for the present secondary analysis. It is recommended to explain the sampling strategy shortly.

The sampling strategy has been included shortly in the methodology. See Line 174-181

* In data analysis, it is not clearly demonstrated how logistic regression was used. Was a uni- or multivariate analyses performed? Was collinearity assessed? Please explain in detail.

Logistic regression used was a multivariate analysis. Collinearity was assessed, the details have been included in the manuscript. See line 253-255

* Why the level of significant was not \( p < 0.05 \)?

The level of significance used was \( p < 0.05 \), it has been edited to reflect this. please see line 255

* It seems that only univariate analysis were performed. Multivariate analyses are strongly recommended in the present study.

This was done. it is stated in the methods and the table 7 and 8 are results of the multivariate analysis

* Clearly demonstrate if any missing data were present during data analysis. Additionally, clearly state how missing data was handled.

There were not missing variables in the data handle. The data extracted were those with complete variables as noted in the methodology.
Toothbrush frequency, visit to the dentist and dietary evaluation were not assessed. These variables are strongly correlated if the outcome, and they are not discussed in the present study.

The aim of the study did not include this. This was a secondary data analysis and those variables were not included in this study analysis.

Results
* A flowchart is strongly recommended for the present study. Due to the different age ranges reported in the cited studies, the participants inclusion may not be understood by the other cited studies.

We did not conduct a systematic review. We apologise but we do not understand how a flow chart may be appropriate here. We discussed this and did not know how to address this query.

* In the following sentence: "Participants’ DAI scores ranged from 13 to 48 with a mean score of 20.72 (4.57)", clearly state what 4.57 mean.

This has been stated to mean standard deviation.

* Please provide the univariate comparison for malocclusion profile and sex.

This comparison has been included in the newly created Table 2.

* It would increase readability if most of the descriptive data would be present in a Table, including the comparison between sex of all outcomes.

The comparison between sex has been included in the Table 2. We currently have 8 tables in the manuscript. We felt the other details are okay being left as narratives.

* In Table 2 to 4, what statistical analysis were performed? Clearly state in the Tables. Was logistic regression? If that is not the case, clearly state in the Data analysis section.

Chi square tests were performed for these tables, it has been included in the data analysis section.

*I did not understand why, for both multivariate analyses of gingivitis and caries, the Oral Hygiene Index was not included as an independent variable. It seems odd that only malocclusion may be responsible for both outcomes without considering several other independent variables that are already established in the literature.

This has been done.

* Authors may also consider subgroup analysis according to the different dentitions, such as only deciduous dentition, mixed dentition, and permanent dentition.
The diseases – caries and gingivitis are behaviour induced and not dentition induced. For this reason we feel strongly that the outcome of that analysis may not be impactful for programming for action. the data base also did not contain this data

Discussion and conclusion
*This is a cross-sectional study. It is not possible to conclude that any independent variable is a risk factor for the outcomes.

We agree with the reviewer. We have edited this to read associations rather than risk factors.

*Authors fail to discuss important limitations of the present study, such as the absence of very important independent variables, and the not inclusion of important variables in the multivariate analyses.

Thanks for raising this. we have included this in the manuscript. Please see lines 1727-1733.

*Based on my previous comments, the following sentence may be mitigated: "The results of our study once again highlights that there are direct oral health risks associated with malocclusion thereby justifying orthodontic treatment [11] and not just professional efforts of oral hygiene education.[10]"

Edited

* Additional reference #39 does not support the mentioned reference. Gingivitis is not associated with those conditions, periodontitis it is.

Reference 39 now 30 investigated the relationship between cross-bite and periodontal health in the posterior segment of 44 teenagers. “this result did show a relationship between the crossbite and periodontal health as assessed by the plaque index, gingival index and pocket depth measurements” the statement made in our study was about the relationship between cross bite and the presence of plaque.

*In this sense, it may not be reasonable to conclude that orthodontic treatment We have effected edits. the study findings are suggestive and not conclusive evidence.

We have reflected this edit in our comments