Author’s response to reviews

Title: Relationship between oral environment and frailty among older adults dwelling in a rural Japanese community: A cross-sectional observational study

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Dr. Shenuka Singh
Editor
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Dear Editor:

We wish to submit our revised manuscript for publication as an original report in BMC Oral Health, which is titled “Relationship between oral environment and frailty among older adults dwelling in a rural Japanese community: A cross-sectional observational study” (OHEA-D-18-00353), and was co-authored by Yoko Hasegawa, Ayumi Sakuramoto, Hideyuki Sugita, Kana Hasegawa, Nobuhide Horii, Takashi Sawada, Ken Shinmura, and Hiromitsu Kishimoto.
We are grateful to the reviewers for their time, effort, thoughtful suggestions, and insightful recommendations, which we believe have greatly improved our manuscript. All authors have addressed the reviewers’ comments and have subsequently performed extensive revision to the structure and content of the manuscript.

Thus, the revised manuscript represents a comprehensive revision, as suggested by the reviewers. We feel that these changes have improved the quality and style of this report, and we hope that it is now suitable for publication in your journal. Please find our responses (indicated in blue) to the reviewers’ points in the response letter.

I certify that all of the co-authors agree with the revisions of this manuscript.

Respectfully yours,

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Point-by-point responses to the reviewers

We thank the reviewers for their constructive comments. Point-by-point answers to each of the questions from the reviewers and associate editor are shown below. The page and line numbers in the plain text file are also shown.
Reviewer reports:

Tufayl Muslim (Reviewer 1): This is a well-written paper, which is part of a greater study, and can lead to a positive contribution in the development of oral health management protocols and courses of care for geriatric and frail persons. The need for improved oral hygiene care, especially in the case of frail persons where such care may be delivered by caregivers, is highlighted in this study. It would have been beneficial if the study distinguished between those participants who had caregivers versus those who did not. I recommend that the study be accepted, provided that there be consistency in the referencing section (e.g. in some instances abbreviations for journal titles are used, whilst in other instances full titles are used).

- Thank you for your warm comments. We have revised the reference style according to the Instructions for Authors.

Shenuka Singh, PhD (Reviewer 2): Thank you for an interesting presentation. I have the following queries/comments:

Thank you for reviewing our study.

1. How did the researchers test the potential participants' competence to provide informed consent for the study?

- In this study, the subjects themselves applied for participation in the research. We confirmed by telephone that subjects fulfilled the eligibility criteria, and then they participated in the study. Only subjects who satisfied the inclusion criteria were selected in the final data. Individuals who displayed decreased cognitive function (Mini-Mental State Examination score less than 20) were excluded.

2. How is frailty defined? What parameters were considered?

- Frail/pre-frail was determined by the Kihon checklist (KCL). The parameters and details of KCL are described in the main text (Page 4, Lines 18-24). The KCL includes the following domains: instrumental activities of daily living (ADL), social ADL, exercise, falling, nutrition, oral function, cognitive function, and depression. The participants were asked to provide either a “negative” (score: 1) or a “positive” (score: 0) answer, for a total score of 25.
Frailty was determined using the methods introduced by Satake et al.: frail, 8–25 points; pre-frail, 4–7 points; robust, 0–3 points.


3. Background: the authors allude to the relationship between nutritional status and frailty? There is no further mention in the methods section. Please justify.

- Nutritional status is one of the domains included in the KCL. Therefore, nutrition status was used in this study for determining the extent of frailty.

4. What was the purpose of this sub-study?

- The ultimate aim of this study was to clarify the relationship between oral status and physical condition (physical frailty, sarcopenia, subsequent disability), and the longitudinal impact of oral health (i.e., oral frailty) on adverse health outcomes.

5. What were the research questions and hypotheses (bacterial count) in light of the study design?

- This study is a cross-sectional observational study which assesses the relationship between physical frailty and oral hygiene condition. We hypothesized that there is a close relationship between the deterioration of oral hygiene and the progression of frailty, and that bacterial count increases as oral hygiene deteriorates.

6. Did the questionnaire comprise open ended questions? If yes, how was this analysed?

- No, the KCL uses closed-ended questions.

7. Who was responsible for administering the questionnaire?

- Ken Shinmura administrated the questionnaire and this study.
8. How was the questionnaire validated? What was the Cronbach's alpha score? How was this interpreted?

- The KCL was developed entirely for the purpose of evaluating frailty in older adults. The KCL has been verified to be related to the frail evaluation method. (Sampaio, P.Y.S., Sampaio, R.A.C., Yamada, M., Ogita, M., Arai, H., 2014. Validation and translation of the Kihon Checklist (frailty index) into Brazilian Portuguese. Geriatrics & Gerontology International 14, 561-569.) According to this paper, Cronbach's α coefficient was 0.787.

9. Where was the oral examination conducted? How was participant privacy maintained? How was infection control maintained?

- All oral examinations were performed in a dedicated room in the survey venue. The intraoral examinations were performed in a partitioned space that maintained the privacy for each participant. For the equipment used in this study, all parts that came into contact with patients were disposable and were exchanged for each patient. We added these explanations in the Methods section (Page 5, Lines 3-6).

10. At which time of the day was the oral /clinical examination conducted, noting that this could affect the production of saliva. How was this controlled?

- Major factors known to influence the amount of resting saliva secretion in elderly adults include body water content, collection time (biological clock), participant’s posture during collection, autonomic nervous activity, and current medication. As the measurement time (from 10:00 to 14:00) and measurement posture (sitting position) were unified among all participants, the remaining differences that might have affected the production of saliva were differences in autonomic nervous activity, body moisture, and internal medicines of each patient. As these factors also affect the progression of physical frailty, we did not perform statistical adjustment for these factors in this study. We added these descriptions to the Methods section (Page 5, Lines 3-6).


- The number of bacteria in this study was measured using a rapid oral bacteria detection apparatus (Panasonic Healthcare Co., Tokyo, Japan, Page 5, Line 15-21). DiElectroPhoretic
Impedance Measurement (DEPIM) is a measurement method that collects bacteria in a liquid in a liquid by dielectrophoresis, measures changes in impedance, and converts it into bacterial concentration in 1 mL of sample. (Patent No. 3669182). With bacterial detection technology "DEPIM", bacterial count measurement results equivalent to culture method can be obtained in about 1 minute.

References are shown below.


12. How did the authors measure adherence to regular medication (as suggested by the Table 3? Please review.)

- We collected the information on internal medication both self-declaration and medication notebook. Although 79.5 %of all subjects took some internal medicine from self-declaration, 18.5% of the subjects had unknown internal medicine information. Some subjects did not recognize the details of their own internal medicine, some subjects left their medication notebook, and self-declaration and contents of the medicine notebook did not match. Therefore this study did not take into account the situation of internal medication. Meanwhile, there were some subjects who were prescribed internal medications that listed "thirst" as a side effect in the Ethical Drug Package Insert.

Table 3 shows the result of oral hygiene status by COACH (Kishimoto, H., Hasegawa, Y., Takaoka, K., Noguchi, K., 2016. Oral management for creating functional oral cavity in eating. Journal of Japanese Society for Parenteral and Enteral Nutrition 31, 687-692.). This table does not show the situation of internal medicine.

We wrote in the Discussion as a study limitation that this study did not considered internal medication (page 7 Line 22-27).

13. I am interested in possible associations between underlying disease processes versus oral hygiene status. Please can you provide more detail on this?
We examined the following 18 medical history by closed-questionnaire: hypertension, diabetes, hyperlipemia, hyperlipidemia, liver disease, kidney disease, heart disease, asthma, tuberculosis, pneumonia, gastric ulcer, osteoporosis, rheumatism, thyroid, collagen disease, blood disease, stroke, cancer and other (free writing).

The relationship between oral hygiene statue in Table 3 and the 18 medical history, only significant relationship was recognized “teeth and denture” with hypertension (χ² test). There was no significant association with salivary bacterial count by Mann-Whitney U test. Since there was no significant relation between frailty and medical history. We add these results in Page 6 Line 8-11.

14. What about the association between degrees of frailty and the ability to practice oral health care optimally? Please expand on this.

The study population aged ≥ 65 years was recruited from apparently healthy community-dwelling elderly people in a rural area of the Hyogo prefecture in Japan. Because the subject of this study were independent elderly, and we excluded individuals who displayed decreased cognitive function (Mini-Mental State Examination score less than 20). They had sufficient ability to care their own teeth and oral function. We revised the description of the Participants (page 4 Line 6-15).

15. Please provide more references for the Discussion section.

According to your suggestions, we revised discussion and references.

16. The Conclusion section needs to be reviewed and amended in accordance to the methods and results sections.

According to your suggestion, we revised the Conclusion section to be more in accordance with the Methods and Results.