Author’s response to reviews

Title: Emotional stimuli candidates for behavioural intervention in the prevention of early childhood caries: a pilot study

Authors:

Michaela Bartosova (michaela.bartosova@fnusa.cz)
Miroslav Svetlak (miroslav.svetlak@fnbrno.cz)
Martina Kukletova (makukl@med.muni.cz)
Petra Borilova Linhartova (plinhart@med.muni.cz)
Ladislav Dusek (dusek@iba.muni.cz)
Lydie Izakovicova Holla (holla@med.muni.cz)

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Author’s response to reviews:

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Dear Editor,


Manuscript (MS) was revised according to referees’ suggestions (all changes were marked with a “text-marker” yellow) and all questions raised were addressed (particular changes made are listed on separate pages). We acknowledge the reviewers’ effort and hope that the revised form of the MS will be acceptable for publication in your journal.

Yours faithfully,
Specific changes made in manuscript OHEA-D-18-00175R3 - revision

To: Reviewer 1

1. I sincerely thank the authors for their effort in this study and the editors for giving me a chance to review it.

   Answer: Thank you for your evaluation.

2. As a general concept, the English of the article can be improved. There are some long sentences, which make it hardly understandable.

   Answer: The English was improved – we sent our manuscript for reading to our native speaker colleague.

3. This is a well-organized clinical study, but I'm not quite sure that I understand the methods correctly.

   Answer: We tried to explain the methods better (page 5-7).
4. The aim of the study should be clearly stated at the end of the introduction section. It would help the readers understand the study better.

Answer: The aim was reworded and transferred to the end of the Introduction section. (However, the Aim should be stated in the Methods section according to BMC Oral Health Submission Guidelines https://bmcoralhealth.biomedcentral.com/submission-guidelines/preparing-your-manuscript/research-article).

„The aim of this study was to ascertain which visual stimuli with a supporting text evoke the strongest emotional response in infants’ mothers and, therefore, are suitable candidates for inclusion in behavioural interventions within the prevention of ECC.“ (page 2, paragraph 1 and page 5, paragraph 3).

5. What was the study sample size based on?

Answer: The sample size was planned on the basis of expected width of 95% confidence interval for average score estimate with expected standard deviation of pseudo-continuous scoring scale 1. The acceptable width for the 95% confidence interval of average score estimate was set as 0.7; it corresponds to N=35. The computation of the overall sample size was estimated using previously experienced response rate approximately 30-40% in similar studies [21-23]. The response rate to the questionnaires was estimated to be assumed to be approximately 40%, thus 97 mothers were addressed to reach 35 – 40 responses. The final number of the obtained questionnaires generated a sample size which was sufficient for the planned statistical estimates with a relevant confidence interval (page 7, paragraph 2 and page 12, paragraph 3).

6. The intent, as far as I understood, was to identify the visual stimuli that would provide the desired response for quitting the behaviour desired to be stopped, as in made in cigarette packs. What was considered choosing the relevant visual stimuli?

Answer: Yes, you understood it right. “The visual stimuli were chosen according to the experience of the clinicians from our out-patients clinic. The most serious conditions were included in aversive pictures. The positive picture set was composed of the most desired aims of prevention of dental caries.”

This text was added into the Methods section (page 5-6, paragraph 1).
7. Are there any conflicting factors such as the psychological state of the mother which might affect her perception regarding the stimuli?

Answer: In general, every perception is influenced by our experience. Emotionally charged stimuli can serve as motivation on the one hand, but it could activate ego defense mechanisms such as denial (it does not concern me) or emotion regulation strategy like a situation selection (I do not want to see these nasty pictures) on the other. That is why we need to find pictures with emotional intensity, which is optimal and connected with the recommendation. What can I do to approach or to avoid this situation. Too low or high intensity does not trigger the motivation. The former option does not attract attention, the latter triggers emotion regulation. We did not include the above mentioned text into the MS as the title and aims of the study were modified.

8. The biggest limitation of this study was that the sample consisted of conscious mothers. An advertisement or stimulus, which is expected to address larger audiences and create the desired change, needs to be prepared for unconventional audiences, apart from the audience they usually target. What belongs to you is already yours, the important thing is to win what you don't own.

Answer: We agree with the reviewer, this is a real limitation of our study. On the other hand, the interest in the study does not mean that the mother is conscious, namely in the care for the oral health of her child. Though many of them are well informed about the main causes of caries (poor oral hygiene, inappropriate dietary habits, and low tooth surface exposure to fluoride), they often do not realize that caries is an infectious disease and thus it is appropriate not to exhibit a child to a potential transfer of cariogenic bacteria (kiss a child on the lips, taste the meal with one spoon, lick the pacifier). Clinical experience has shown that the knowledge alone is not enough, it is necessary to behave adequately according to these experiences, but this is a complex problem (For example – I know I should not serve sweet but the infant has a bottle with a sweet beverage – this is a more comfortable way how to regulate the infant’s emotions than to behave according to the knowledge). This statement is confirmed by the fact that three children had caries (D1) on all four upper incisors. We consider the fact that “non conscious mothers” were not involved to be a problem, but primarily we addressed 97 mothers and a dentist then examined 97 children, but subsequently, the SAM questionnaire was filled out only by 39 mothers (i.e. 40 %). Mothers for their participating in the study were not rewarded, this could affect motivation namely of the low-income (socially weak) – i.e. “non conscious mothers”. We extended the part Limitation of our study in the Discussion section of the revised manuscript (page 12, paragraph 3).
9. This study promises novel aspects in preventive dentistry. However, it needs to be more understandable.

Answer: Within the revision of our manuscript we tried to explain and describe better all methodological and other reservations of the reviewers. We hope that the revised version of the MS will be more understandable.

Thank you again very much for your comments that as we hope helped improve quality of our article.

To: Reviewer 2

1. This is an interesting paper describing the emotional response to information related to ECC. However, the title did not reflect the actual aim of the study.

   Answer: We changed the title so that it corresponded better the actual aims of our study.

   Title “Emotional stimuli candidates for behavioural intervention in the prevention of early childhood caries: a pilot study”

   „The aim of this study was to ascertain which visual stimuli with a supporting text evoke the strongest emotional response in infants’ mothers and, therefore, are suitable candidates for inclusion in behavioural interventions within the prevention of ECC.“ (page 2, paragraph 1 and page 5, paragraph 3)

2. The introduction also lacks coherence and it is too wordy. I suggest summarizing the first 3 paragraphs in the introduction into one succinct paragraph.

   Answer: According to the reviewer suggestions’ we summarized the first 3 paragraphs in the introduction into one paragraph (and did some additional changes in definition as suggested by reviewer 3) (page 4, paragraph 1).

3. The introduction should end with the aim. You also should write on the smoking campaign and its theoretical underpinning.
Answer: The aim was transferred to the end of the Introduction section. (However, the Aim should be state in the Methods section according to BMC Oral Health Submission Guidelines https://bmcoralhealth.biomedcentral.com/submission-guidelines/preparing-your-manuscript/research-article).

Sentences about the smoking campaign were deleted according to the suggestion of reviewer 3. Smoking campaign was mentioned in the Discussion section. (page 11, paragraph 3)

4. There are many theoretical models of behaviour change, you can choose one that fits your intervention.

Answer: Several studies have focused on behavioural interventions within prevention of ECC and other oral diseases. Behavioural interventions to reduce caries have been based on a variety of behaviour change theories and approaches – mainly the social cognitive theory and the related health belief model and theory of planned behaviour, self-determination theory, and motivational interviewing (https://www.ncbi.nlm.nih.gov/pubmed/26438210). – added into revised version of our manuscript (page 9-10).

Considering the socio-cultural differences, it is suitable to select adequate stimuli for the relevant population so that to achieve the highly efficient intervention. This was the aim of our pilot study as a similar intervention has not been developed and standardized for the Czech population yet. We intend to create a portfolio of emotionally-charged stimuli (images with texts) and then verify their effectiveness in behavioural intervention. The relationship between the exposition of the stimuli material and subsequent preventive behaviour (for example reduced consumption of sweeten drinks, regular preventive check-ups of children etc). The stimuli material can be a beta version for a motivational interview which we will test on a bigger sample of the population, we can draw an inspiration from the studies in the population of the American Indians (https://www.ncbi.nlm.nih.gov/pubmed/30238061). Although results from published studies are controversial, the motivational interviewing has been proposed as a potentially useful behavioural intervention for oral health promotion (https://www.ncbi.nlm.nih.gov/pubmed/30239532). Effective behavioural interventions in the form of image and text material are the basis for the creation of, for example, a preventive program for smart phones / mobile applications for Czech pregnant women and mothers of young children, see for example (https://www.ncbi.nlm.nih.gov/pubmed/29739842).

Thank you again very much for your comments that as we hope helped improve quality of our article.
To: Reviewer 3

Thank you very much for inviting me to review this manuscript. The topic is interesting. However, I suggest that the author should pay attention on the words used. Some words in this manuscript are misleading and not precise.

Besides, there are some issues need to be address:

Two critical issues needed to be addressed:

1. First of all, the aim of this article is inconsistent in the abstract and in the main text. According to the main text, it should be 'establish an intervention approach' and figure out its effectiveness on changing mothers' behaviour. However, the outcome measurement is the SAM which is an 'emotional assessment tool'. The author may need to justify how a mother's emotion related to mother's behaviour and how mother's behaviour helps to prevent ECC (as suggested by the title)?

Answer: The concept of our study was corrected. The aim was reworded and united in the Abstract and Introduction section. We are sorry, that the aim in our previous study aim was not accurately described.

„The aim of this study was to ascertain which visual stimuli with a supporting text evoke the strongest emotional response in infants’ mothers and, therefore, are suitable candidates for inclusion in behavioural interventions within the prevention of ECC.“ (page 2, paragraph 1 and page 5, paragraph 3).

In general, behaviour could be defined as an effort of people to get closer to the desired emotional state. In other words, actions in reaction to emotions should lead to the achievement of a more “good for me” or less “bad for me” state. Desired preventive behaviour is then a way how they can regulate their “bad for me state” triggered by aversive or positive pictures to which mothers were exposed. For example, each mother wants to be a good mother who looks after her child in the best possible way. Some stimuli are so pleasant for mothers that they want to approach them and behave according to them. On the other hand, if you are exposed to an aversive stimulus such as a child with a swollen face, and it is obvious that this happened because the mother neglected prevention of such a condition, she will probably want to avoid this unpleasant experience. Avoidance is prevention in this case and prevention is our goal. We rewrote the introduction section (page 4-5).
2. Moreover, how can a cross-sectional study conclude that the intervention influences the dental caries prevention as there is no follow-up for tracking the behaviours and oral health status changes? The result seems unable to answer this research question. This study can only provide some information about the relationship of the self-designed questionnaire (20 stimuli) and the mother’s emotion. Please narrow down the aim and objectives.

Answer: The aim and objectives were narrowed down and reworded. We are sorry, that our previous study aim was not described accurately.

3. It is written in the abstract that oral examination will be performed on the infants. However, there is no single paragraph in the main text about the oral examination. As the title and the aim are related to the prevention of dental caries, please revise.

Answer: The examination of the child served mainly to the dentist for establishing a closer contact with the mother in order to involve her in the study and to determine the characteristics of the subjects under study. The dmft index was calculated using dental caries (D1 level) as a cut-off point for the detection of decay (this information was included into the method section of the revised manuscript – page 6). The examination revealed beginning caries in three children (d1mft) on all upper incisors, i.e. d1mft=4, the other children were caries free.

There are some other issues needed to be addressed:

Abstract:

Methods: Please provide details on sampling method? Study site? Index adopted? and Statistic methods? More details are listed in the Methods part of revised manuscript.

Answer: Methods part in Abstract was rewritten in the revised manuscript

“Thirty-nine mothers of one-year-old children, who filled out an originally designed questionnaire containing 20 visual stimuli with accompanying texts related to dental caries (10/10 with positive/negative intended emotional response), were included in this cross-sectional study. The mothers evaluated the emotional impact of each stimuli using the Self-Assessment
Manikin (SAM) technique, which represents three emotional dimensions: valence, arousal, and dominance. The data was analyzed by software Statistica.” (page 2, paragraph 2).

4. Result: In the result, it should report with the numbers and statistic results. Please don't discuss in the result.

Answer: We avoided discussing in the Results section. Numbers are not self-explanatory about the results of emotional evaluation, so we used words for the evaluation (page 2, paragraph 3).

5. Conclusion: please match the aim and conclusion. The conclusion is not suitable as the result only shows that the stimulus related to the emotion, and there is no data showing that it can helps to improve mother's behaviour let alone the effectiveness of preventing ECC. The statement seems exaggerate the results.

Answer: Aim and Conclusion in Abstract were united. As you said, we cannot evaluate, how/if we will be able to improve mother’s behaviour.

„The aim of this study was to ascertain which visual stimuli with a supporting text evoke the strongest emotional response in infants’ mothers and, therefore, are suitable candidates for inclusion in behavioural interventions within the prevention of ECC.“ (page 2, paragraph 1 and page 5, paragraph 3)

This pilot study proved that negative pictorial and text warnings about the risks of developing caries has the potential to evoke strong emotional responses in the mothers of infants. We identified three visual stimuli that could be included in future extensive motivation material in an attempt to affect the preventive behaviour of mothers, and thus the oral health of their infants in future.“ (page 3, paragraph 2 and page 13, paragraph 2)

Main text

6. In line 54-57, please clarify the definition of ECC. It leads to misunderstanding (a form of a teeth …… second year of life)

Answer: The definition of ECC was corrected according to AAPD (ref. 5).

“Early childhood caries (ECC) is defined as the presence of one or more decayed (non-cavitated or cavitated lesions [d1-d4□], missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six [AAPD, 2017].” (page 4, paragraph 1)
7. In Ln 57-59, the definition is wrong (Severe ECC (s-ECC) is present if there is no caries-free tooth surface in children younger than 3 years....). Please check the definition of AAPD (Reference 5) for the correct description.

Answer: Thank you for your recommendation – the definition was corrected according to the AAPD (ref. 5).

“Severe ECC (s-ECC) is any sign of smooth-surface caries in a child younger than three years of age [AAPD, 2017].” (page 4, paragraph 1)

8. Ln 46, 50 – 52 what do you mean by low tooth surface exposure?

Answer: The given expression means a low exposure to fluorides that increase the resistance of teeth/enamel against acids – the text says “low tooth surface exposure to fluorides” – reference was added “[EAPD, 2008].” (page 4, paragraph 1, reference 1)

9. Ln 68-72 should be deleted

Answer: The lines 68-72 were deleted as suggested.

10. Ln 73-89 should be more precise

Answer: We do our best to be more precise and we completely rewritten the Introduction section (page 4-5).

11. Why do you think that the factor that you study may relate to dental caries?

Answer: Although a partial effect of genetic factors in the dental caries etiopathogenesis has been considered recently, the basic factor are the effects of the environment (correct teeth cleaning, saccharide intake, fluoride delivery) that are affected by the behaviour of parents (children’s caregivers). Therefore, we believe that the identification of behavioural factors may be important in improving the prevention of this disease.

12. I am wondering that if there is any similar study on this factor conducted in dental and medical. Please revise the research gap.
Answer: Yes, there are studies focused on behavioural intervention within prevention of ECC and also other oral diseases. Behavioural interventions to reduce caries have been based on a variety of behaviour change theories and approaches—most often, the social cognitive theory and the related health beliefs model and theory of planned behaviour, self-determination theory, and motivational interviewing (MI) (https://www.ncbi.nlm.nih.gov/pubmed/26438210) – added into revised version of our manuscript (page 9-10).

Considering the socio-cultural differences, it is suitable to select adequate stimuli for the relevant population so that to achieve the highly efficient intervention. This was the aim of our pilot study as a similar intervention has not been developed and standardized for the Czech population yet. We intend to create a portfolio of emotionally-charged stimuli (images with texts) and then verify their effectiveness in behavioural intervention. The relationship between the exposition of the stimuli material and subsequent preventive behaviour (for example reduced consumption of sweeten drinks, regular preventive check-ups of children etc). The stimuli material can be a beta version of a motivational interview which we will test on a bigger sample of the population, we can draw an inspiration from the studies in the population of the American Indians (https://www.ncbi.nlm.nih.gov/pubmed/30238061). Although results from published studies are controversial, the motivational interviewing has been proposed as a potentially useful behavioural intervention for oral health promotion (https://www.ncbi.nlm.nih.gov/pubmed/30239532). Effective behavioural interventions in the form of image and text material are the basis for the creation of, for example, a preventive program for smart phones / mobile applications for Czech pregnant women and mothers of young children, see for example (https://www.ncbi.nlm.nih.gov/pubmed/29739842).

13. Please state the aim and objectives clearly in the introduction. I think the author should be careful for the words, as I am not sure if it can 'establish' a preventive approach by just one pilot cross-sectional study.

Answer: The aim was narrowed down and reworded. We are sorry, that the aim of our previous study was not described accurately.

14. The aim in the main text is different from the one in the abstract, please revised.

Answer: The aim in Abstract and in Introduction section was united (page 2 and page 5).

15. What do you mean in Ln 98-101? Are you focusing on the comparison of these two kinds of picture on mothers' response? What does it related to the research question? It seems there is no statistical data about the differences of these two kinds of pictures.
Answer: We did our best to explain our research question better than in the previous version of the manuscript. „The aim of this study was to ascertain which visual stimuli with a supporting text evoke the strongest emotional response in infants' mothers and, therefore, are suitable candidates for inclusion in behavioural interventions within the prevention of ECC.“ (page 2, paragraph 1 and page 5, paragraph 3).

Mothers of infants did not know whether we considered the stimulus as positive or negative, their task was to express using three scopes the emotions triggered in them by the stimulus. Please see the Instruction for filling out the electronic questionnaire, which were presented to mothers, we added it to the revised Additional file 1.

16. In the questionnaire, which stimuli are for the consequence and which one is the result of the behaviour? Please provide the information.

Answer: Pictures 2, 4, 6, 8, 10, 11, 12, 14, 16, 18, 20 represent desired preventive behaviour. The rest of them represent risk behaviour and its consequences. (page 6, paragraph 1)

17. Why do you choose this age group (infant)? Please justify in the discussion.

Answer: We did not choose infants but mothers of infant. “We believe, that intervention within prevention of ECC should be targeted at mothers as they play important role in health behaviour of the whole family, especially of infants.“ (page 10, paragraph 2) The most suitable group for behavioural interventions is a group of pregnant women; however, we do not meet them at the pediatric dentist department. Therefore, we selected the women who came with the youngest children who had at least all incisors, it is around one year. At this age it is also possible to detect possible changes indicating caries incipiens. Therefore, we consider this period as the best time for targeting preventive programs.

18. How did you calculate the sample size? Is it big enough to perform the data analysis? Besides, why do you adopted convenient sampling, please also justify in the discussion.

Answer: The sample size was planned on the basis of expected width of 95% confidence interval for average score estimate with expected standard deviation of pseudo-continuous scoring scale 1. The acceptable width for the 95% confidence interval of average score estimate was set as 0.7; it corresponds to N=35. The computation of the overall sample size was estimated using previously experienced response rate approximately 30-40% in similar studies [21-23]. The response rate to the questionnaires was estimated to be assumed to be approximately 40%, thus
97 mothers were addressed to reach 35 – 40 responses. The final number of the obtained questionnaires generated a sample size which was sufficient for the planned statistical estimates with a relevant confidence interval (page 7, paragraph 2 and page 12, paragraph 3).

19. What are statistic methods adopted? Is hypothesis testing performed? Please provide the details.

Answer: The software Statistica v. 13 (IBM Corporation, 2013) was used for the data analysis. The relationships between the 3 dimensions (valence, arousal, dominance) were computed using Spearman's correlation coefficient (r). For the description of variables the mean and standard deviation (SD), median and interquartile range (IRQ), and minimum and maximum were used. Statistical significance of relationship between categorical variables was tested using Fisher exact test, statistical significance of differences in ordinal scores between groups was tested using Mann Whitney U test. The sample size was planned on the basis of expected width of 95% confidence interval for average score estimate with expected standard deviation of pseudo-continuous scoring scale 1 (page 7, paragraph 2).

20. Who educate the mother, only one facilitator or more than one? How to make sure that the effectiveness of education by different people is the same? What kind of education materials adopted (Ln 106)?

Answer: The aim was narrowed down. Intervention was not conducted, it was found out what they knew about risk factors.

“The basic demographic characteristics (age of mothers, education of both parents), and their awareness of caries risk factors and dental caries prevention, i.e. suitable diet, drinking sweet beverages, significance of teeth cleaning/brushing, suitable teeth brushing techniques, observance of oral health of their children etc., were determined in all of them. Subsequently, after being instructed how to record the emotional perception evoked in them by a stimulus on the SAM scale (see Additional file 1)” (page 6-7).

21. As I have mentioned earlier, how can the author determined that the emotion can affects the behaviour in the cross-sectional study? (Ln 122) Please discuss or provide information in details.

Answer: As you said, we cannot evaluate, how/if we will be able to improve mothers’ behaviour. We only determined submitted stimuli with the highest potential in behavioural intervention within prevention of ECC.
Results:

22. Please provide the background information of the studied mothers, and whether the infants are the first-born children, as it may related to mothers' knowledge or consent.

Answer: We added demographic and caries-risk characteristics into the Methods and Results sections of revised manuscript in line with reviewer suggestion (page 6-8). There were no exclusion criteria for mothers and infants, we did not find out whether the children were first-born. The future intervention will be intended for all pregnant women and mothers of infants no matter whether the first or second-born children are concerned.

23. About the borderline of negative and positive and the response of mothers, is there any references or guidelines of the usage of SAM? If so, please provide the details, if not please justify why (Table 1).

Answer: Theoretically, in valence, the value 5 on SAM can be considered as “borderline”, which is neutral. Borderlines in arousal and dominance cannot be determined. The cut-off point is meaningful for a diagnostic tool, but not for a scale that measures the intensity. Borderlines in Table 1 is for clarity/better presentation of results and the excluding of stimuli with the highest emotional impact. We selected a limit of 75% of participating mothers (exclusion Q4), we did not follow any template.

24. What dose low valence stands for? When mothers stimulate by the stimuli, they are unhappy? Please report the result clearly.

Answer: Low valence means, that stimulus evokes unpleasant emotions in subject. Please see the explanation in the Instructions for filling out of the electronic questionnaire, which was submitted to mothers and which was added to the revised Additional file 1.

25. In table 1, for the V and T, what dose W and I stands for? It's hard to understand Table 1 and hard to understand how the participants be instructed to filled in the questionnaire and rate the SAM?

Answer: Please see the explanation in the Instruction for filling out of the electronic questionnaire, which was submitted to mothers and which was added to the revised Additional file 1. Three emotional dimensions and scale were explained. Then participants were given the questionnaire with visual stimuli with supporting texts and they marked one of the 9 manikins from each dimension for each of 20 stimuli. Results are summarized in Table 1, mothers did not know how the stimuli were intended by us whether these were positive or negative visual stimuli.
with a text warning or text information. Table 1 serves for the comparison of the intended vs. by mothers perceived subtext of the stimulus.

26. For the questionnaire, how to defined which stimuli is positive and which is negative? (Ln 141). This paragraph is confusing? Please state clearly what are these results suggesting.

Answer: The content of positive and negative pictures was chosen according to clinicians experience from our out-patients clinic. The most serious conditions were included in aversive pictures. The positive picture set was composed of the most desired aims of prevention of dental caries. This text was added into the Methods section (page 5-6, paragraph 1).

27. For Ln 152 to 154, why do you perform the analysis of the relationship between valence and arousal? Are you suggesting that they have a relationship? If so what is this relationship related to your study aim? Please justify.

Answer: Yes, we suggested that there is a relationship between valence and arousal. Thus, we confirmed a well-known fact that the lower valence, the higher arousal is. We proved that our results are in line with the theory of basic dimensions of emotions. It is difficult to find stimuli with high valence and high arousal. And this is a problem in future behavioural intervention with not only negative stimuli (as in anti-smoking campaign) but also with positive stimuli (“to be a good mother“).

28. The description of Ln 152-154 is confusing. Isn't control is measured by domain? If the author analyze the arousal and valence, how can the data show the relationship with control? Please justify or report it clearly.

Answer: The scope of dominance is problematic and many authors went off it in their research. In the factors analyses, it was the third most dimension of emotions but most research works present only valence and arousal. In our study: “It is evident that exposition of mothers to stimuli did not cause a significant loss of control over the evoked emotions (see Table 1). The median value of all responses was higher than 5 in all cases. For this reason, only the results relating to the remaining two subscales (i.e. valence and arousal) are further presented.” (page 9, paragraph 3)

29. Discussion: In Ln 180 to 184, I agree that emotion may influence the behaviour. However, my concern is that the result of this study can only provide that there is a relationship between the stimuli. Please discuss or correct the manuscript.
Answer: The results primarily show the emotional impact each of 20 stimuli on mothers of infants. The Discussion section was completely revised (page 9-13).

30. Discussion: In Ln 190 to 210, please provide more information of similar study in the discussion. How does it like? What can we refer from these studies? What dose this study and other studies contribute to this field. How do these stimulus helps the dentist or researcher to prevent dental caries in the future? The discussion part should not only repeat the result. Please revise.

Answer: The discussion section was rewritten. “Several studies have focused on behavioural interventions within prevention of ECC and other oral diseases. Behavioural interventions to reduce caries have been based on a variety of behaviour change theories and approaches – mainly the, social cognitive theory and the related health belief model and theory of planned behaviour, self-determination theory, and motivational interviewing ([https://www.ncbi.nlm.nih.gov/pubmed/26438210](https://www.ncbi.nlm.nih.gov/pubmed/26438210), [https://www.ncbi.nlm.nih.gov/pubmed/30239532](https://www.ncbi.nlm.nih.gov/pubmed/30239532))” (page 9-10).

“The most effective approaches in preventive medicine are those with minimal economic costs and maximum population impact [16]. Searching for stimuli that evoke strong emotions and address the relevant target groups is a key step of each effective preventive intervention.” (page 10, paragraph 3)

Thank you again very much for your comments that as we hope helped improve quality of our article.

To: Reviewer 4

The manuscript investigated an interesting approach that "could be" used to prevention of oral diseases, including early childhood caries. However, some methodological aspects are unclear. The main concern about the study is related to what the study seems to be evaluating and what it actually evaluates.

1. The title and aim of the study suggest that an intervention study was performed, since the study indicated a tool to prevention for dental caries, but this has not been tested. It was observed in the study the emotional stimuli of mothers in certain situations, which does not necessarily imply in behaviour changes and prevention of dental caries, and this should be tested. I suggest rewriting title and aim.
Answer: The title and aims were rewritten according to your suggestion (and also suggestion of other reviewers).

Title “Emotional stimuli with potential for use in behavioural intervention within prevention of early childhood caries: a pilot study”

„The aim of this study was to ascertain which visual stimuli with a supporting text evoke the strongest emotional response in infants’ mothers and, therefore, are suitable candidates for inclusion in behavioural interventions within the prevention of ECC.“ (page 2, paragraph 1 and page 5, paragraph 3)

Some minor concerns are pointed below:

Abstract

2. The conclusion section should be reviewed since the tool has not been tested.

Answer: The Conclusion in Abstract was reworded.

“This pilot study proved that negative pictorial and text warnings about the risks of developing caries has the potential to evoke strong emotional responses in the mothers of infants. We identified three visual stimuli that could be included in future extensive motivation material in an attempt to affect the preventive behaviour of mothers, and thus the oral health of their infants in future.” (page 3, paragraph 2 and page 13, paragraph 2)

Introduction:

3. The last paragraph of the introduction does not seem appropriate since it presents information that must be in the methods section and does not contain the objective or even a hypothesis for the study. It should be made clearer that a pilot study of tool development is being done and not of this tool as an approach to ECC prevention.

Answer: The last paragraph of the introduction was moved to the method section as suggested. (page 6, paragraph 2) We hope that by rewriting the aim of the study sufficiently clarified that we were looking for suitable stimuli with the potential at behavioural intervention and that we did not test the impact of the intervention at ECC prevention.

Methods:
4. The aim of the study should be in the introduction section. Was the aim of the study to establish a suitable behavioural intervention approach and its level which could affect risky behaviour of mothers and change it? The conclusion not responded to this aim.

Answer: The aim was transferred to the end of the Introduction section. (However, the Aim should be state in the Methods section according to BMC Oral Health Submission Guidelines https://bmcoralhealth.biomedcentral.com/submission-guidelines/preparing-your-manuscript/research-article). The aim was narrowed down and also conclusion was reworded. We are sorry, that our previous study aim was not described accurately.

5. I suggest present the child age in months.

Answer: According to your suggestion, the child age was given in months. (page 7, paragraph 3)

6. It is unclear what was assessed in the interview and what was self-reported. Only the age in months was described in the characteristics of the sample. Could other characteristics influence the outcome of the study? Why were not they described?

Answer: We added demographic and caries-risk characteristics (obtained during the interview in the dental office) into the Methods and Results sections of revised manuscript in line with reviewer suggestion (pages 6-7). Yes, some characteristics, such as education of parents could influence the study outcomes. Mothers were not rewarded for their participation in the study, this could be reflected in a low motivation of mainly less educated/low-income (socially weak) – i.e. “non conscious mothers”). –This is one of limitations of our stud, that “non conscious” mothers did not participate in our study.

7. Methods: More details about SAM method could be described, as the score and domains.

Answer: SAM method was described in detail in Methods part.

“The emotional impact of these 20 individual stimuli on mothers was evaluated using the Self-Assessment Manikin (SAM) method (Fig. 1) [10]. The SAM graphical scale is a tool for the assessment of the three basic emotional dimensions: valence, arousal, and dominance. The emotional valence (first line in Fig. 1) is a bipolar scale which describes a continuum between polarities that are extremely unpleasant (unhappy manikin on the left) and extremely pleasant (happy manikin on the right). The scale ranges from 1 to 9 (1 extremely unpleasant, 5 neutral, 9 extremely pleasant). The arousal scale (the second line in Fig. 1) represents a continuum which ranges from 1 (calm, relaxed manikin on the left) to 9 (extremely excited, aroused manikin on
the right). The dominance scale (third line in Fig. 1) describes the level of subjectively referred sense of control over the emotion evoked by the stimulus. It ranges from 1 (loss of control, manikin on the left) to 9 (full control, manikin on the right). The subject is instructed to evaluate their immediate subjective feeling being evoked by the test material (texts and pictures in our study) across the three afore-mentioned dimensions” (page 6, paragraph 2)

Results:

8. The description of the stimulus could be described in the results instead of using the numbers in order to make the reading more fluent in this section, so the authors would not have to go to the supplementary material for interpretation of each result, but this is only a suggestion and not a problem.

Answer: We are sorry for inconvenience, but a supplementary material (Additional file 2) with visual stimulus and supporting text is necessary for understanding results.

Thank you again very much for your comments that as we hope helped improve quality of our article.