PEER REVIEW HISTORY

ARTICLE DETAILS

Title (Provisional)

Optimization of Services to Prevent Dental Caries for School-age Children in China: A Discrete Choice Experiment

Authors

Wang, Lidan; Chen, Zhu; Chen, Sixuan; Jin, Xinyu; Hu, Lu; Jiang, Jiacheng; Yu, Hong; Xu, Jianguang; xu, wenhua

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VERSION 1 - REVIEW

Reviewer **1**

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Affiliation **University of Geneva, Of Orofacial rehabilitation, Division of Gerodontology and removable prosthodontics**

Date **22-Apr-2024**

COI **-**

Optimization of Service to Prevent Dental Caries for School-age Children China: A Discrete Choice Experiment.

I want to thank you for the opportunity to review your manuscript intitled: ‘’ Optimization of Service to Prevent Dental Caries for School-age Children China: A Discrete Choice Experiment.’’

General comments

The preventive approaches in schools aged children are a very important topic. You have very nicely introduced the different preventive approaches available for the school aged kids, like fissures and pit sealants, fluoridation and early detection of caries.

The goal of this study was to understand the factors that influence guardians’ decisions when choosing a caries prevention services for their children and to

understand whether some factors weigh more or have more importance on the final decision or choice that the guardian make. You have conducted qualitative research by interviewing several experts and researching the literature. You have defined the attributes and the levels that you have found to influence the uptake for preventive services for children. You have then applied the DCE methodology to get the questionnaire related to these attribute and levels. You did a partial factorial model. To be included as a respondent, they needed to be guardians of school aged children, living in Anhui province. You have administered the questionnaires with the help of a group of investigators, that obtained informed consent and helped answer any questions that participants had pertaining to the attributes and the levels. You have excluded invalid questionnaires. The final questionnaire enquired about the socioeconomics and demographics of the respondents. The questionnaire asked about previous dental preventive history. You have conducted a sample analysis and determined that you need 85 participants, but you recruited 785 respondents. You calculated beta, and it influence of the choice on the final decision of the respondents.
Your results indicated that respondents preferred significantly the service to be on their days off, within 10-25min, with the better effectiveness or quality. And they were willing to pay for their choice.
The preventive effectiveness was the most important attribute, something that can only be intuitive. The manuscript presents valuable insights into the preferences of guardians for dental caries prevention services. With some restructuring and clarification, it could significantly impact public health strategies and policymaking.

The introduction is informative yet lengthy with some repetition. Condense the global prevalence data into two sentences and focus more on relevant data from China. Streamline the discussion around oral health policies to directly link with the study aims.
The explanation of methodological choices, including attribute levels and questionnaire design, requires more detail to justify their relevance and selection. Please provide a clearer rationale for including specific service attributes and their levels, ensuring all scenarios presented are plausible. Some of the findings are not clearly presented, the transition from service cost to willingness to pay needs clarification. Can you present the service cost findings in a table format to enhance clarity and impact. The discussion should directly tie the results to existing literature and explicitly state the study's implications for policymaking. Begin with the main findings before comparing them to previous studies. Clearly articulate the practical applications of the research in public health policy. Discuss the limitations of your study: in one region in china, bias from a very strong level, not very specific on the type of preventive service. In your conclusion clearly outline your key results and their implications for public policy and suggest specific actions for policymakers.

I hope that you will find this review constructive and hopefully will improve the clarity and the quality of the manuscript.

More specific and detailed comments are listed below:

Abstract.

Line 23: spelling

The number 758 participants belong to the results.

Result: rephrase your first result sentence: when you say tend to receive, the reader can. Be confused and would think that the study is interventional.

A suggestion is to present the results as the respondent's preferences or choice.

If you are citing the willingness to pay as a result, to use the same term across the manuscript. In the materials and methods, you have referred to service cost and, in your results, it is referred to as willingness to pay.

The conclusion needs to also be rephrased for clarity. What do you mean by demand side perspective. It would be nice to rephrase to articulate the reason why you did this experiment and give an insight about your understanding of how this result should influence the public health policies.

Introduction:

The introduction is very interesting and informative, however some information are repeated and is long. I think the introduction should only introduce the clinical question and should be limited to 1 to 2 pages. Enhance the introduction by focusing more succinctly on why understanding guardians' decision-making processes is crucial. This will help in tailoring services that better meet their needs and expectations.

The first paragraph until line 60 is about prevalence of caries in the world, can you concise that in 2 sentences and then get the prevalence in China that is more related to the context of the article. Then rephrase the paragraph on oral health policies and be more specific and straight to the point. A suggestion is to cite chronologically the different policies, pit and fissures sealing, the early caries prevention fluoridation and the future goal of these policy makers. You don't have to cite all the organisms, make sure to put them in the reference so that readers that are interested in reviewing the program and the policy can read about them. And the reader of your manuscript is still focused on your presentation of the problem or the questions that need to be answered to improve public health strategies.

On line 87, it is very interesting to explain that some policies have shown a successful outcome. But need to also to make it shorter.

In line 93, I don't understand why we are back to the descriptive of a cohort and prevalence. It is very interesting, but it does not flow with the previous section and as a reader, I am still waiting for information related to the study and the

research question. And the line 92 to 97 don't have a reference and have a specific information about a public budget dedicated to preventive approaches.
line 99-100 The next paragraph is not clear: it seemed to me that you want to introduce effectiveness of preventive approaches, but you are citing studies, but the idea is still not well phrased. You need to rephrase it in one or two sentences.
Line 111: some health economics that in my opinion should have been introduced much earlier in the introduction.
Line 115: maybe avoid foreign research, the readers are going to be from all around the world, what could be foreign to you could be local to me.
And I don't understand the study that you are explaining and the relevancy to the current study. And the citation is prior to the end of the sentence, is it study 25, 26?
Line 123-4: rephrase, I don't understand what you mean here.
Line 127: it is not true that it was not applied in oral health, the DCE methodology is applied in oral health.
The aims of the study need to be clarified and my suggestion is to put the factors that are being investigated in this section, time of service, willingness to pay, effectiveness of the procedure, travel time etc..
Line 133: remove this sentence about the importance of these questions, it was the background behind those questions.

Methods:
Can you cite the 7 attributes initially identified. Can you explain what you did in the order that you did it and how you got to the first set, the second set of attributes and your final table.
Can you explain more in this part how you did your initial qualitative research, how many experts, how many questions were asked, how did you analyze.
I am a bit confused with the attribute of effectiveness; I don't understand where the effectiveness numbers are coming from. Service cost, service date, travel time make sense but need to be also justified in this paragraph.
Table 1: my suggestion is to remove the definition and keep the reader with the attribute and their different levels.
Need to justify how you got from a questionnaire with 128 questions to only 8 bundle of choices.
Line 181: can you explain exactly what you mean, I understood that you added a 9^{th} question to make sure that the respondent is focusing on the questionnaire? It is not clear what you mean here, rephrase for clarity. It seems like an important post hoc exclusion criteria.
Table 2
I don't understand this table, the superscript on one column but not the other. Is it on purpose, it is confusing.

Data collection:

This section could go in the introduction. The reader wants to know how you have conducted the data collection, the information about the context should go into the introduction.
You can start at line 200.
You can remove line 204 and start with describing the inclusion criteria required from the participants.
Line 213 remove doesn't add info and you did a sample size calculation.
You must justify or explain why you have surveyed 150 when you only needed 85.
Line 222, can you explain step by step what you did. It is confusing.
How did you administer the survey, face to face, online, in focus groups, how many were present at each session, where were they recruited one on one or in groups.
Can you rephrase how you excluded all the responses that were considered non-valid. And explain how those questionnaires were filtered.
The collection of the 785 questionnaires is a result and should go into the result section.
Do you think you can add the questionnaire comprising the final 9 questions in the appendix or in a table so we can understand what finally the respondents had to answer.
Statistical analysis:
Can you rephrase and be more explicit in explaining to the methodology who might not be familiar with the stochastic utility theory. You need to explain the utility function to reader as it related to this study, which are you variables, cite the different options in j (1, 2)
Make this longer but more detailed so that reader unfamiliar with the methodology can still understand the work that was done.

Results:
Line 290, you state that 74.1 had children with dental caries- you should add in the materials and methods that you have asked this question in your questionnaire.
Same for pits and fissure and prevention visits.
Table 3: the first part of the table is demographics of the participants,
The second part of the table are survey questions and should be in a separate table.
Table 4: can you put Beta in estimate, for the clarity in reading the results and understanding them. What is Asc 1 and Asc 2?
Service cost and wtp, can you add the numbers, we can only see p.
Can you put the willingness to pay results in the table. And what results did you use to get those numbers.

Discussion:

Remove the 336-345 line in the beginning of the discussion, it is a repetition, you have said that before in the background. . And start by stating your most important result.
Can you rephrase your finding, our participants or guardians found that they prefer better effectiveness of preventive approaches, want to be 10mn from the service provider and are wtp XXX for that service.
I agree that the result is very logical, who would want to have poor quality services and answer a questionnaire demanding a low-quality service. I think that to address this bias in your methodology Guardians are willing to pay more and it does not matter to them very much if they have to travel a little longer, they are making appointment when on vacation.
So your recommendation to public health care policies to improve effectiveness of preventive measures, but don't we all want that.
It would be interesting, if you could remove the effectiveness of the preventive strategy and redid your analysis so we can understand the effect of travel time, wtp and working days or vacation.
It would have been nice if you have analyzed the income with WTP, do those who earn more are willing to pay more, since you are mentioning it in your discussion.
371: rephrase ''*Therefore, it is necessary to train medical personnel to improve their skills'',* you can make a suggestion on how to improve skills, continuous education courses for dental professionals.
Line 283; where is this statement coming from, is this a comment on the result? Is should be in the beginning of the discussion as these questions were asked before the DCE. The discussion of results follows the same order of outcomes as in the results.
387: you are making a recommendation, rephrase for clarity and move behind the recommendation to train personnel to improve their skill.

Conclusion:
Can you rephrase your most important result and explain the implication of your finding on public policy makers. The study addresses an essential topic of preventive dental care in school-age children, a significant concern for public health. The use of a discrete choice experiment to understand guardians' preferences in Anhui Province is commendable.

VERSION 1 - AUTHOR RESPONSE

Response to Review 1:

1. The introduction is informative yet lengthy with some repetition. Condense the global prevalence data into two sentences and focus more on relevant data from China. Streamline the discussion around oral health policies to directly link with the study aims.

The author's answer: We thank you very much for the meaningful suggestion, and we revised the introduction to improve clarity and readability.

2. The explanation of methodological choices, including attribute levels and questionnaire design, requires more detail to justify their relevance and selection. Please provide a clearer rationale for including specific service attributes and their levels, ensuring all scenarios presented are plausible.

The author's answer: Thank you for your valuable recommendation. The details of the attributes and levels had been described from line 104 to 117 in "Identification of attributes and levels" of the "METHODS" section in revised document. As follows:

In this study, the DCE commenced with a literature review to identify key attributes relevant to CPS, such as caries type (i.e., primary or permanent tooth decay), preventive service time (the date on which the child participates in CPS), preventive effectiveness (the probability of reduction in dental caries following CPS participation), healthcare institution (the type and level of the healthcare institution from which the child receives CPS), distance (the travel time to the healthcare institution by public transport, including buses or subways), and out-of-pocket (OOP) service costs per tooth for CPS.

Following this, we engaged in a consultative process with three clinical oral health specialists in the fields of pediatric dentistry and preventive dentistry to validate and refine these attributes and their levels. Based on the feedback, we removed "caries type" and "healthcare institution" due to their overlap with other costs and the lack of relevance in real-world scenarios. Ultimately, the selected attributes included preventive service time, preventive effectiveness, distance, and OOP service costs (Table 1).

3. Some of the findings are not clearly presented, the transition from service cost to willingness to pay needs clarification. Can you present the service cost findings in a table format to enhance clarity and impact.

The author's answer: Thank you for your kind suggestion. We further illustrate the transition from service cost to willingness to pay, the revised text was shown from line 203 to 206 in "Statistical analysis" of "METHODS" section.

4. The discussion should directly tie the results to existing literature and explicitly state the study's implications for policymaking. Begin with the main findings before comparing them to previous studies.

The author's answer: Thank you for your expert guidance and advice, we have revised the discussion. The revised text had been described from line 296 to 348 in "Discussion" section.

5. Clearly articulate the practical applications of the research in public health policy.

The author's answer: As your suggestion, we further illustrate its application to public health policy. The revised text had been shown from line 341 to 348 of "Discussion" section in "Main Document".

6. Discuss the limitations of your study: in one region in China, bias from a very strong level, not very specific on the type of preventive service.

The author's answer: We fully agree with you. We have revised the limitation in main text. The revised text has been shown from line 350 to 357 in the "Limitation" section as follows:

This study fills a significant gap in our understanding of the CPS preferences of children with caries in China. However, it has some limitations. First, there could be a lack of generalizability in the results as the survey was limited to Anhui Province. However, Anhui Province is a populous central region that attracts people from across China, making it a representative location for the study. Second, the study population was based on the population of hospital stomatology departments. The sample thus lacks representation from community settings, where willingness to seek medical treatment and WTP may differ.

Response to Review 2:

1. The introduction is very interesting and informative, however some information is repeated and is long. I think the introduction should only introduce the clinical question and should be limited to 1 to 2 pages. Enhance the introduction by focusing more succinctly on why understanding guardians' decision-making processes is crucial. This will help in tailoring services that better meet their needs and expectations.

The author's answer: Thank you for your professional advice, and we have revised the introduction improve clarity and readability.

2. The first paragraph until line 60 is about prevalence of caries in the world, can you concise that in 2 sentences and then get the prevalence in China that is more related to the context of the article. Then rephrase the paragraph on oral health policies and be more specific and straight to the point. A suggestion is to cite chronologically the different policies, pit and fissures sealing, the early caries prevention fluoridation and the future goal of these policy makers. You don't have to cite all the organisms, make sure to put them in the reference so that readers that are interested in reviewing the program and the policy can read about them. And the reader of your manuscript is still focused on your presentation of the problem or the questions that need to be answered to improve public health strategies.

The author's answer: Thank you very much for the meaningful suggestion, we had revised the section to be more concise. The revised text had been shown from line 59 to 69 in "Introduction" section in the revised vision document.

3. On line 87, it is very interesting to explain that some policies have shown a successful outcome. But need to also to make it shorter.

The author's answer: As your suggestion, we have revised the section.

4. In line 93, I don't understand why we are back to the descriptive of a cohort and prevalence. It is very interesting, but it does not flow with the previous section and as a reader, I am still waiting for information related to the study and the research question.

The author's answer: We removed the description of the epidemiologic information on dental caries.

5. And the line 92 to 97 don't have a reference and have a specific information about a public budget dedicated to preventive approaches.

The author's answer: Thank you for your kindly recommendation, in our initial manuscript, we outlined the caries prevention initiatives and the financial allocations dedicated to them in Anhui Province, highlighting the significance of oral health prevention efforts in the region. Unfortunately, an oversight led to the omission of the necessary citations. To preserve the article's overall coherence, we have removed this section in the revised version. If you are interested the financial planning behind them, we invite you to explore the following link, which offers an in-depth look at the policies and budgets for oral health prevention in Anhui Province: https://wjw.ah.gov.cn/ztzl/jkkqxd/56293831.html.

6. line 99-100 The next paragraph is not clear: it seemed to me that you want to introduce effectiveness of preventive approaches, but you are citing studies, but the idea is still not well phrased. You need to rephrase it in one or two sentences.

The author's answer: As your suggestion, we have revised the section. The revised text had been shown from line 72 to 73 in "Introduction" section as follows:

The effectiveness of fluoride application and fissure sealing in caries prevention has been well documented.[8,9]

7.Line 111: some health economics that in my opinion should have been introduced much earlier in the introduction.

The author's answer: We totally agreed with your suggestion, and we introduced the health economics of dental caries earlier from line 73 to 76 in the "Background" section.

8. Line 115: maybe avoid foreign research, the readers are going to be from all around the world, what could be foreign to you could be local to me. And I don't understand the study that you are explaining and the relevancy to the current study. And the citation is prior to the end of the sentence, is it study 25, 26?

The author's answer: Thank for your kindly reminder, this is a mistake. We have revised the sentence, and the revised version had been shown from line 87 to 92 in "Introduction" section as follows:

The application of DCEs to oral health has been further developed in recent years. In 2021, a UK study[15] found that aesthetics was the most important factor for the general population's preferences for Primary Care Dental Practices, with a preference for scale and polish over personalized oral hygiene advice. In 2023, a study in Saudi Arabia[16] indicated heterogeneity in adults' preferences for primary dental care, with "ability to get an appointment" being the most influential attribute.

9. Line 123-4: rephrase, I don't understand what you mean here.

The author's answer: This is a mistake, and we have removed it.

10. Line 127: it is not true that it was not applied in oral health, the DCE methodology is applied in oral health.

The author's answer: Thank you for reminding us to avoid making a big mistake. The revised text had been described from line 87 to 94 in "Introduction" section.

11. The aims of the study need to be clarified and my suggestion is to put the factors that are being investigated in this section, time of service, willingness to pay, effectiveness of the procedure, travel time etc.

The author's answer: Thank you for your professional advice, we have revised the sentence according to your valuable suggestion. The revised text had been shown from line 96 to 101 in

"Introduction" section.

12. Line 133: remove this sentence about the importance of these questions, it was the background behind those questions.

The author's answer: As your suggestion, we removed it.

13. Can you cite the 7 attributes initially identified. Can you explain what you did in the order that you did it and how you got to the first set, the second set of attributes and your final table. Can you explain more in this part how you did your initial qualitative research, how many experts, how many questions were asked, how did you analyze. I am a bit confused with the attribute of effectiveness; I don't understand where the effectiveness numbers are coming from. Service cost, service date, travel time make sense but need to be also justified in this paragraph.

The author's answer: Thank you for your professional advice, the process that attributes and levels determined initially were described from line 104 to 117 in "Identification of attributes and levels" of "METHODS" section. Furthermore, the process of attribute and level determination were added as Part 1 in the Supplementary Appendix.

14. Table 1: my suggestion is to remove the definition and keep the reader with the attribute and their different levels.

The author's answer: As your suggestion, we had removed it.

15. Need to justify how you got from a questionnaire with 128 questions to only 8 bundle of choices.

The author's answer: The revised text had been shown from line 120 to 124 in "Experimental design" of "METHODS" section as follows:

Considering the attribute and level combinations, we identified 128 possible choice sets ($4^3 \times 2^1$). However, the use of a full factorial design was inconsistent with actual situations.[18] Therefore, the partial factorial design was used to create an efficient design through Choice Metrics' Ngene software (version 1.1.2) to maximize horizontal D-efficiency[19] and minimize the overlap among attribute levels.

16. Line 181: can you explain exactly what you mean, I understood that you added a 9th question to make sure that the respondent is focusing on the questionnaire? It is not clear what you mean here, rephrase for clarity. It seems like an important post hoc exclusion criteria.

The author's answer: As your suggestion. To ensure the quality of the DCE survey, we added a test choice set in middle of the DCE questionnaire. In the test choice set, the option A is dominate in all the attribute levels. The detail of the test choice set was described from line 132 to 136 in "Experimental design" of "METHODS" section as follows:

Thus, a dominant choice task was included after the formal DCE sets to assess response validity.[23] In this set, all attribute levels of service A were superior to service B. Respondents who did not choose service A were considered to have failed the test, and their data were excluded from the main analysis.

17. Table 2: I don't understand this table, the superscript on one column but not the other. Is it on purpose, it is confusing.

The author's answer: Thank you for your kindly reminder, we have revised Table 2 for enhanced clarity. Both columns of attributes in Table 2 are accompanied by superscript annotations, offering additional clarification on their definitions to facilitate the reader's comprehension.

18. You can start at line 200. You can remove line 204 and start with describing the inclusion criteria required from the participants.

The author's answer: As your suggestion, we removed it.

19. Line 213 remove doesn't add info and you did a sample size calculation. You must justify or explain why you have surveyed 150 when you only needed 85.

The author's answer: Thank for your suggestion. As the requirements of DCE study, 84 sampling was needed in our study, the size of our survey is sufficient. We added the information in line 160-166 in "Study sample" of "METHODS" section as follows:

To determine sample size, we adhered to the widely accepted DCE rule of thumb:[24]

$$n > 500c/(t \times a)$$

In this formula, n is the recommended minimum sample size, t denotes the number of tasks, a is the number of choice options per task, and c is the maximum number of attribute levels in the DCE. For our study parameters (t = 8, a = 3, and c = 4), the minimum acceptable sample size was calculated to be 84. Therefore, a sample size larger than 84 was deemed sufficient for statistical analysis.

20. Line 222, can you explain step by step what you did. It is confusing. How did you administer the survey, face to face, online, in focus groups, how many were present at each session, where were they recruited one on one or in groups. Can you rephrase how you excluded all the responses that were considered non-valid. And explain how those questionnaires were filtered. The collection of the 785 questionnaires is a result and should go into the result section. Do you think you can add the questionnaire comprising the final 9 questions in the appendix or in a table so we can understand what finally the respondents had to answer.

The author's answer: Thank you for your suggestion, we added the details of survey process, and the revised version had been shown from line 168 to 179 in "Data collection" of "METHODS" section. Furthermore, the 9 DCE choice sets were added as Part 2 in the Supplementary Appendix.

21. Statistical analysis: Can you rephrase and be more explicit in explaining to the methodology who might not be familiar with the stochastic utility theory. You need to explain the utility function to reader as it related to this study, which are your variables, cite the different options in j (1, 2) Make this longer but more detailed so that reader unfamiliar with the methodology

can still understand the work that was done.

The author's answer: As your suggestion, we have revised the Statistical analysis. The revised text had been shown from line 188 to 194 in "Statistical analysis" of "METHODS" section in "Main Document" as follows:

Based on stochastic utility theory, respondent i derived utility from alternative j in the selection option set t, and this was represented as:

$U_{ijt} = X_{ijt}\beta + \varepsilon_{ijt}; i = 1, \ldots, 785; j = 1,2,3; t = 1, \ldots, 8;$

Where β is a vector of coefficients and X_{ijt} is a vector of variables representing the attributes of alternative j. For the unforced choice model, j = 1, 2, 3. When the random term ε_{ijt} was assumed to be independently and identically distributed according to the Type I extreme value distribution, the model became a conditional logit model.

22. Line 290, you state that 74.1 had children with dental caries- you should add in the materials and methods that you have asked this question in your questionnaire. Same for pits and fissure and prevention visits.

The author's answer: Thanks for your kindly reminder, we have added the additional information in the article. In addition to the DCE questions, we also sought information on the guardian's demographic information and the child's oral health status, details of which were described from line 141 to 145 in "Experimental design" of "METHODS" section in "Main Document" as follows:

In addition to the DCE section, the questionnaire included two other sections: Section one, which contained a series of questions regarding respondents' demographic characteristics (e.g., sex, age, annual household income), and Section two, containing information on self-assessed oral health status, prior involvement in fluoridation or fissure sealing, and willingness to participate in such services.

23. Table 3: the first part of the table is demographics of the participants, The second part of the table are survey questions and should be in a separate table.

The author's answer: Thank you for your valuable insights. We have marked the part of guardians and children respectively, to enhance the table clarity. And we still hope we can present the information in the same table. We also would like to know your suggestion further.

24. Table 4: can you put Beta in estimate, for the clarity in reading the results and understanding them. What is Asc 1 and Asc 2? Service cost and WTP, can you add the numbers, we can only see P. Can you put the willingness to pay results in the table. And what results did you use to get those numbers.

The author's answer: We updated the table2, in the updated table we have incorporated an alternative-specific constant (ASC) as a way to represent the "Neither" option, which had been described from line 128 to 129 in "Experiment design" of "METHODS" section. And as your suggestion, we have incorporated the additional information into the table for a more comprehensive presentation.

25. Remove the 336-345 line in the beginning of the discussion, it is a repetition, you have said that before in the background. And start by stating your most important result.

The author's answer: As your suggestion, we have removed it.

26. Can you rephrase your finding, our participants or guardians found that they prefer better effectiveness of preventive approaches, want to be 10mn from the service provider and are WTP XXX for that service.

The author's answer: Thank you for your suggestion, the revised section has been described from line 297 to 301 in "Discussion" section as follows:

The preferred attributes included a > 90% preventive effectiveness, 10 – 25-minute distance, services offered during vacation, and lower OOP service costs. To assess CPS with these attributes and levels, they were willing to pay an additional 409 CNY, 84 CNY, and 87 CNY, respectively.

27. So your recommendation to public health care policies to improve effectiveness of preventive measures, but don't we all want that. It would be interesting, if you could remove the effectiveness of the preventive strategy and redid your analysis so we can understand the effect of travel time, WTP and working days or vacation.

The author's answer: Thank you for your suggestion. First of all, DCE simulates choice scenarios through the setting of choice sets, and the levels of attributes in each choice set are different, and we mainly infer the choice preferences of the research subjects through their choices of different attributes and levels.

As your suggestion, we tried to select the choice set with similar prevention properties for the analysis, and the results showed that distance is the most important attribute, but its importance is over-represented, which is clearly not consistent with our main effect results. On the one hand, it may be that the importance of the distance attribute has been emphasized, but this does not exclude the bias introduced by the inability to perfect the removal of the preventive efficiency attribute.

Your suggestions very insightful to us, but we apologize that it may not be possible to do what you want in this study. In any case, your suggestions will serve as a good reference for us to conduct similar studies in the future, and we sincerely thank you for your advice and help!

28. It would have been nice if you have analyzed the income with WTP, do those who earn more are willing to pay more, since you are mentioning it in your discussion.

The author's answer: We have analysed the heterogeneity of guardian preferences based on the latent class logit model, and we find that female guardians with advanced education prioritized effectiveness, while those with higher incomes preferred CPS during vacations. The added information had been shown from line 270-294 in "Preference heterogeneity" of "RESULTS" section.

29. rephrase *"Therefore, it is necessary to train medical personnel to improve their skills",* you can make a suggestion on how to improve skills, continuous education courses for dental professionals.

The author's answer: Thank you for your professional advice, we have revised it. The revised sentences had been shown from line 327 to 331 in "Discussion" section as follows:

Therefore, it is necessary to train healthcare workers to improve their caries prevention skills. Continuous medical education and training for dental practitioners should be carried out in remote areas, and dental practitioners should be encouraged to further their studies in large dental hospitals and stomatology departments of advanced hospitals to improve their caries prevention skills.

30. Line 383; where is this statement coming from, is this a comment on the result? Is should be in the beginning of the discussion as these questions were asked before the DCE. The discussion of results follows the same order of outcomes as in the results.

The author's answer: Thank you for your kindly reminder, we removed it.

31. Line 387: you are making a recommendation, rephrase for clarity and move behind the recommendation to train personnel to improve their skill.

The author's answer: As your suggestion, we revised the paragraph to improve the clarity and readability. The details had been shown from line 341 to 348 in "Discussion" section as follows:

Although the incidence of caries ranks first among childhood diseases, our study revealed that some guardians did not understand the necessity of fluoride and fissure sealing, and most guardians had poor awareness of children's oral healthcare. This gap underscores the need to enhance oral health education, which can be delivered through dental healthcare providers, primary and secondary school teachers, and community residents, to augment oral health education. Tailoring CPS to the preferences of different demographic groups and local contexts will better meet the demand for such services.

32. Can you rephrase your most important result and explain the implication of your finding on public policy makers. The study addresses an essential topic of preventive dental care in school-age children, a significant concern for public health. The use of a discrete choice experiment to understand guardians' preferences in Anhui Province is commendable.

The author's answer: Thank you for your valuable comments and recognizing our work. We have revised the sentences from line 359 to 366 of "Conclusion" section as follows:

Preventive effectiveness emerged as the most prominent factor influencing guardians' CPS preferences. However, preventive service time, distance, and OOP service costs were also important factors in guardians' choice of different services. Policymakers should thus improve the preventive effectiveness of caries prevention to meet the core needs of these services. Additionally, female guardians with advanced education prioritize CPS with higher preventive effectiveness, while guardians with higher annual household incomes prefer CPS during vacation periods. These findings offer insights for the future implementation of policies aimed at increasing CPS uptake in China.

VERSION 2 - REVIEW

Reviewer	**1**
Name	**Chebib, Najla**
Affiliation	**University of Geneva, Of Orofacial rehabilitation, Division of Gerodontology and removable prosthodontics**
Date	**29-Oct-2024**
COI	

Thank you for the revision of the manuscript, it is much easier to read, the attributes and the methods are clearly presented.

The introduction flows nicely, the materials and the choice of attributes is well presented.

My suggestion though is to add to your limitation that one of your attribute ''the preventive effectiveness'' is the logical response. I can not imagine a guardian asking for low preventive effectiveness. I understand that you want to have a scale in the quality of the service provided but no one respond yes to low preventive effectiveness unless it is a forced choice in a DCE.

The choice of the dominant choice set is based on the authors own preferences, I think it also should be mentioned in the limitation of the study or the discussion.

Can you clarify how you divided the respondants in two classes (Class I, Class II) in your methodology prior to presenting the table 4 in the results.

The manuscript needs another round of english and spelling editing before publication.

Thank you for the opportunity to review your manuscript.

Reviewer	**2**
Name	**Carrandi, Lane**
Affiliation	**Monash University, School of Public Health and Preventive Medicine**
Date	**15-Oct-2024**
COI	

Thanks for the opportunity to review a second draft of this manuscript. The revised manuscript is well-written and thorough. I have presented some minor suggestions below for the authors' consideration:

Page 2, line 40: “while those with…” – is this female guardians only or all guardians with higher incomes?

Page 2, line 44: What do you mean by better CPS – higher quality?

Page 3, line 45: “These findings provide a foundation for policymakers…” – have you addressed the generalizability of the findings, or is this policymakers in particular regions?

Page 4, line 50: You examined guardian preferences, as opposed to children’s?

Page 4, line 55: “A community population was thus lacking to compare…against the general population” Do you mean your results may not reflect the general population’s willingness to seek CPS?

Page 5, line 78: Do you mean “relevant” as opposed to “relative” studies?

Page 6, lines 88-95: I would suggest removing these sentences as they do not add much to the justification of the study aims.

Page 6, line 111: Typically, DCEs are developed in consultation with the end-user – in this case, guardians of children. Can you please explain why this approach wasn’t taken and how you may be missing key attributes influencing decisions about CPS uptake?

Methods: Include ethical approval details.

Page 8, lines 141-149: Can you please clarify whether you asked guardians to self-report their demographic characteristics and oral health status or whether they answered them on behalf of their child?

Page 13, line 277: Can you please clarify the characteristics of Class 1 and Class 2?

Page 15, line 312: “related to the economic level”. Are you referring the income level of respondents? Can you please also describe the limitation of your exclusion criteria? For example, excluding people with limited literacy means you likely excluded people with lower educational levels. Reducing OOP costs for populations of lower income and educational levels may be an effective way to increase CPS among these populations.

VERSION 2 - AUTHOR RESPONSE

Response to Review 1:

1. My suggestion though is to add to your limitation that one of your attributes "the preventive effectiveness" is the logical response. I can not imagine a guardian asking for low preventive effectiveness. I understand that you want to have a scale in the quality of the service provided but no one respond yes to low preventive effectiveness unless it is a forced choice in a DCE.

The author’s answer: Thank you for your valuable suggestions. Discrete Choice Experiment

(DCE) is a type of stated preference research method that primarily judges respondents' preferences for different attributes based on their choices among various choice sets. The design of the choice set is intended to simulate real-world scenarios, incorporating various attributes and their levels. Although in our study, preventive effectiveness is the most important attribute, and as you said, almost everyone would choose the option with higher preventive effectiveness. However, in the real world, preventive effectiveness is just one of the attributes to consider; meanwhile, there are other attributes such as the preventive service time, distance, and out-of-pocket service costs that need to be taken into account. Therefore, the respondents' ultimate choice was guided by trade-offs multiple attributes and their levels.

2. The choice of the dominant choice set is based on the authors own preferences, I think it also should be mentioned in the limitation of the study or the discussion.

The author's answer: We are not sure if we fully understand your comments. Following DCE design guidelines (from line 96 to 109 in the "METHODS" section), we identified the final attributes and their corresponding levels. The dominant choice set is used to test the validity, and including three options: Service A, Service B, and an "Neither" option. Service A and Service B are composed of the same attributes, yet the levels of each attribute in Service A are superior than in Service B.

Based on the Principle of Rational Economic Agent, individuals are inclined to make choices that maximize their own utility. In this study, Service A represents the option that better serves individual interests. Consequently, if they do not select Service A, it may indicate a misunderstanding of the DCE question. Therefore, we will exclude such responses from the final data analysis.

3. Can you clarify how you divided the respondents in two classes (Class I, Class II) in your methodology prior to presenting the table 4 in the results.

The author's answer: We apologize for not providing a detailed description of the methodology in the previous draft. Using the LCL model, we categorized the respondents into several subgroups, based on the Akaike information criterion (AIC) and Bayesian information criterion (BIC). Using the lower AIC and BIC values as the criteria, we determined the number of subgroups.

We have supplemented the section with a detailed description of the methodology. The revised text was shown from line 211 to 219 in the "Statistical analysis" of the "METHODS" section of revised document. As follows:

"To further explore the heterogeneity of guardian preferences, we conducted a latent class logit (LCL) analysis.[21] The main aim of the LCL was to further examine preferences heterogeneity in the respondent data and to link differences in preferences to differences in demographic characteristic. The preference heterogeneity is the degree to which preference for CPS vary between guardians, i.e., the extent to which different guardians have different preferences. Using the expectation-maximization algorithm, we constructed an LCL model with different numbers of groups. The Akaike information criterion (AIC) and Bayesian information criterion (BIC) were used to compare the model fit, with lower AIC and BIC values indicating better models.[22]"

4. The manuscript needs another round of English and spelling editing before publication.

The author's answer: Thank you for your suggestion; the manuscript has been polished by Editage.

Response to Review 2:

1. Page 2, line 40: “while those with…” – is this female guardians only or all guardians with higher incomes?

The author’s answer: Thank you for your kind reminder. We revised the relevant text in the main text to avoid any ambiguity, from line 39 to 41 in the revised document. As follows:

“Guardians with college education or higher and female prioritize preventive effectiveness, while guardians had children with caries history and had children with better oral health status preferred CPS during vacation.”

2. Page 2, line 44: What do you mean by better CPS – higher quality?

The author’s answer: The “better CPS” refers to a caries prevention service (CPS) with superior attribute levels, which not only includes higher preventive effectiveness but also contains lower out-of-pocket service costs, shorter distances, and receive CPS during vacations.

3. Page 3, line 45: “These findings provide a foundation for policymakers…” – have you addressed the generalizability of the findings, or is this policymakers in particular regions?

The author’s answer: Our study was conducted in Anhui Province, with mid-level of among all provinces in China. Therefore, we believe that the conclusions of this study have a certain degree of generalizability. This is what we stated in the “LIMITATIONS” section of the original text, from line 355 to 356. As follows:

“However, Anhui Province is a populous central region that attracts people from across China, making it a representative location for the study.”

4. Page 4, line 50: You examined guardian preferences, as opposed to children’s?

The author’s answer: Our research explores the preferences of guardians for children's (aged 3-12 years) caries prevention services, with the background that the decision of child’s caries prevention services is made by their guardians.

We apologize for the vague in the previous statement. The revised text was shown from line 50 to 51 in the “strength and limitations” section and from line 89 to 91 in the “BACKGROUND” section of the revised document. As follows:

“This study used a discrete choice experiment to capture the preferences of guardians for CPS.”

“Therefore, this study aimed to implement a DCE exploring the preference of guardians toward a potential CPS for school-age children.”

5. Page 4, line 55: “A community population was thus lacking to compare…against the general population” Do you mean your results may not reflect the general population’s willingness to seek CPS?

The author’s answer: We apologize for the incorrect description. Our study had been conducted in hospitals. Next, we would like to conduct further research in the communities, and compare the preference heterogeneity across different groups. We also mentioned this in the “LIMITATIONS” section in the main document.

The revised text was shown from line 56 to 57 in the revised document. As follows:

“The study's sample was drawn from stomatology departments of hospitals, lacking representation from community setting.”

6. Page 5, line 78: Do you mean “relevant” as opposed to “relative” studies?

The author’s answer: Thank you for your kind reminder, it was a spelling error, and we have already corrected it.

7. Page 6, lines 88-95: I would suggest removing these sentences as they do not add much to the justification of the study aims.

The author’s answer: As your suggestion, we have removed it.

8. Page 6, line 111: Typically, DCEs are developed in consultation with the end-user – in this case, guardians of children. Can you please explain why this approach wasn’t taken and how you may be missing key attributes influencing decisions about CPS uptake?

The author’s answer: We determined the final attributes and levels through literature review and expert consultation. Initially, we organized some factors that respondents were particularly concerned about regarding caries prevention services through a literature review. Nevertheless, due to the methodological limitations of DCE, the study could not include as many attributes as we would like. And then, we invited three experts to a consultation, who are specialists in clinical and nursing practice of oral health. Based on their feedback, we established the final attributes and their levels in the DCE choice sets.

9. Methods: Include ethical approval details.

The author’s answer: We added the ethical approval details into the “Data collection” of “METHODS” section in the revised document. As follows:

“This study received ethical approval from the Ethics Committee of Anhui Medical University (approval no. 2021H030).”

10. Page 8, lines 141-149: Can you please clarify whether you asked guardians to self-report their demographic characteristics and oral health status or whether they answered them on behalf of their child?

The author’s answer: We apologize for our unclear expression. In fact, we collected information in two parts: demographic characteristics of guardians and oral health information of their children. The oral health information of children was provided by the guardians. We have clarified this in the main text. The revised text was shown from line 133 to 138 in the “Experimental design” of “METHODS” section. As follows:

“In addition to the DCE section, the questionnaire included two other sections: Section one, which contained a series of questions regarding guardians’ demographic characteristics (e.g., sex, age, annual household income) and the guardians’ willingness to take their child participate in such services. Section two, containing child’s oral health status, child’ s prior experience with fluoridation or fissure sealing, child’s experience with caries.”

11. Page 13, line 277: Can you please clarify the characteristics of Class 1 and Class 2?

The author’s answer: As your suggestion, we have rephrased the characteristics of Class1 and Class2 to make them easier understand for readers. The revised text was shown from line 290 to 295 in the “Preference heterogeneity” of “RESULTS” section in the revised document. As follows:

“The expected values of the significant predictors are shown in Figure 2. Compared to Group 2, Group 1 has more guardians with college education or higher (52.47% vs 49.31%), female (73.10% vs 65.77%), had daughters (44.05% vs 40.80%), and had children with poor oral health status (75.19% vs 70.18%). In Group 2, there are more guardians with an annual household income not less than 100,000 CNY (35.34% vs 33.91%), and had children with

dental caries history (26.06% vs 21.98%).”

12. Page 15, line 312: “related to the economic level”. Are you referring the income level of respondents?

The author’s answer: Yes, we intended to express that it is related to the income level of the families. We apologize for any confusion caused by the unclear statement. We have already corrected this sentence. The revised text was shown from line 309 to 311 in the “DISCUSSION” of the revised document. As follows:

“This outcome is likely associated with annual household income levels, given that CPS is considerably more affordable relative to income.”

13. Can you please also describe the limitation of your exclusion criteria? For example, excluding people with limited literacy means you likely excluded people with lower educational levels. Reducing OOP costs for populations of lower income and educational levels may be an effective way to increase CPS among these populations.

The author’s answer: Thank you for your valuable feedback. We fully understand your concern, and we believe your point is indeed valid.

In this study, we made the decision to exclude respondents who either did not fully understand the DCE questions or were unwilling to cooperate in completing the questionnaire. It is true that some respondents failed to pass the test choice set due to their limited understanding or literacy, while the higher percentage respondents were excluded due to unwilling to cooperate.

Our exclusion criteria have been described in the “Data collection” of the “METHODS” section in the revised text, specifically from lines 175 to 179. As follows:
“If a questionnaire met any of the following criteria, it was excluded from the final data analysis: (1) respondents maintained the unified option from start to finish (11 items were deleted); (2) the questionnaire failed to pass test choice set (13 items were deleted); and (3) the questionnaire was not fully answered (17 items were deleted).”