Reviewer’s report

Title: Dental caries status and its associated factors among 5-year-old Hong Kong children: A cross-sectional study

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Title: Early childhood caries of 5-year-old Hong Kong children: A cross-sectional study

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The authors of this manuscript reported the prevalence of early childhood caries (ECC) and its risk factors among 5-year-old children in Hong Kong. Although much have been reported about ECC, the prevalence is still high, especially in some countries that warrants further investigations and reporting. Nevertheless, there are some issues that need to be addressed by the authors, and including major issues that require a rewrite. There are also parts of the text that need to be reworked for grammar and style. In my opinion, the manuscript is only acceptable after major correction.

Title

1. The title is too general and does not reflect the objectives of the study which were to investigate the prevalence and risk factors of ECC among 5-year-old children in Hong Kong.

Abstract

1. The abstract needs to be rewritten according to revision of the manuscript.

Introduction

1. The current Introduction provides background and rationale only for the objective to investigate the prevalence of ECC. The literature review on ECC risk factors is missing.
2. This statement requires reference(s): "Water fluoridation has led to a decline in the incidence of dental caries".

Methods

In general, the methods are not clear, not specific and not comprehensive. Some major revisions are required here.

1. According to the authors, stratified random sampling was used, and in the discussion, it was further mentioned that the three main geographical regions in Hong Kong were regarded as strata, and registered kindergarten classes were the sampling units. This is erroneous. Instead of strata, the regions should be regarded as clusters (natural groupings or clusters of units in the population). And the fact that further sampling was done among kindergartens in each region, the sampling method used was actually multistage sampling method.

2. Detailed explanation about the sampling method is required - how many kindergartens were there in each region? How many kindergartens were selected from each region? And how many children were selected from each kindergarten? Or how many children were selected from each region?

3. Page 4, line 91-92: "Children who were uncooperative and could not be examined were excluded from the study" - In any study, of course we will not include anybody who is not cooperative and could not be examined, but these were not exclusion criteria. Exclusion criteria are characteristics of the subjects that may influence the outcome or confound the results, hence you exclude the criteria. Another way of controlling the effects of the characteristics is by collecting the information as a variable and control it in the statistical analysis. In this study, the potential confounders are children with special needs, or certain chronic diseases and conditions, or on prolonged medications. These conditions may put the children at higher risk for caries. However, these criteria were not excluded, and were not controlled.

4. Page 4, line 99: The term gender was used to differentiate between boys and girls. Gender refers to the socially constructed roles, behaviours, activities, and attributes that a given society considers appropriate for men and women. What the authors measured in this study was sex, which refers to the biological and physiological characteristics that define men/boys and women/girls. Please change the term accordingly.
5. It is not clear to me why the authors need to control the following variables. Please justify:

i. Birthplace: How do birthplace influence the prevalence of ECC? It could not be due to fluoride exposure from water fluoridation since caries-preventive effect of ingested fluoride is almost exclusively post-eruptive, particularly due to its influence on demineralization kinetics of dental hard tissues. Deciduous teeth will only erupt as early as 6 months old (except for rare cases of natal and neonatal teeth). Thus, if the reason for collecting this variable is because of exposure to water fluoridation which may have some influence on ECC, the more appropriate variable to collect is the usual place of residence, not birthplace. A woman who lives in HK may go elsewhere e.g. to another country that has no public water fluoridation to deliver the baby (may be their hometown or country of origin) and come back to HK soon after. This means the child have been exposed to fluoride in the water even though he/she was born outside HK.

ii. Assistance in brushing: This can be subjective. Parents are required to assist their children in tooth brushing until they can control the movement of their hands and are able to effectively brush on their own. Some acquire the skill earlier, some acquire it later. Thus, how can this variable be linked to ECC? What is the alternative hypothesis? Which group did the authors expect to have higher ECC prevalence? I do not think the link is plausible unless if the authors can support it with an evidence that suggest 5-year old children have significantly lower tooth brushing capability in terms of effectiveness than the 6-year olds such that they should all be assisted.

6. Some of the variables were not clearly explained:

i. Snacking habit: It can be seen in Table 2 that snacking habit refers to frequency of snacking, either ≤2 times per day or >2 times per day. What is the definition of snacking? Snacking means a light meal that is taken in between main meals. But is snacking harmful to the teeth? Can snacking cause caries? No, not necessarily. It is not the snacking habit itself that poses risk but it is the selection of food to snack that can influence the caries process - whether sugary snack or healthy non-cariogenic snack, and I think what the authors wanted to capture here was the frequency of sugary snack. This must be clearly explained because the response can be inflated if the question did not explicitly state the type of snack. Unless the question includes the word sugary snack, it is wrong to assume that all snacks taken by the children were sugary and cariogenic.
ii. Use of other cleansing aids: What other cleansing aids? It was not mentioned whether the response options were open-ended or closed-ended. Were the parents given a list of oral hygiene aids for them to tick? If so, what are those? Or was it an open-ended question?

iii. Dental visit experience: How was this variable measured? What was the response options? A simple yes or no (as can be construed from Table 2)? Did the authors asked reasons for visit? whether the visit was due to problem or for regular check-up. I expect children who visited dentist due to problems would have higher ECC prevalence, either from 'd' or 'f' component compared to children who visited for regular check-up. It is best to either separate these groups or categorise the children based on duration since their last dental visit instead of a simple yes or no response.

iv. Similar with the variable dental visit, I am concern about how this variable was measured. Did the authors asked about current practice or history of bottle feeding before sleeping? And what was the response options? A simple yes or no? I noticed that the authors also asked about the duration of bottle feeding, whether ≤24 months or >24 months. Nevertheless, of these 2 variables, we know that it is the bottle feeding before sleeping that contributes more to ECC, and we know that ECC may occur as early as the first deciduous tooth erupts. I am afraid if the response to the question about bottle feeding before sleeping is a simple yes or no, the authors may have missed the children with ECC who have stopped night-time bottle feeding just before they reach the age of 5. This is probably why the ECC prevalence between children who were bottle-fed before sleep were not different than those who were not bottle-fed before sleep. And explain why the authors failed to show that use of bottle feed before sleeping is associated with ECC.

7. Page 6, line 138-140: It was stated that "The Mann-Whitney U test or Kruskal-Wallis one-way analysis of variance (ANOVA) was employed to study the distribution of dmft scores according to different variables". I think there is a missing 'or' between "Kruskal-Wallis" and "one-way analysis of variance". From the results presented, I can see that most analysis were based on comparing prevalence of ECC (categorical outcome) between different categorical independent variables (Table 2). Mean dmft, dt, mt and ft were presented in Table 1 and the results shown were all descriptive. The text also did not show any result on the comparison of dmft scores according to different variables. Thus, I wonder when did the authors used the Mann-Whitney U test, the Kruskal-Wallis test and the ANOVA?
8. Explanation about the ZINB regression analysis was also not clear and confusing. The analysis is indicated for modelling count variables with excessive zeros. The authors stated that "Zero-inflated models, the Poisson model and the negative binomial model were taken into account to study the relationships between the dmft scores and background information, snacking behaviours and oral health-related behaviours". The dmft scores are numerical data, not count scores. It can be changed into a count score when the mean is categorised - the number of children with dmft=0 and the number of children with dmft>0.

Results (including tables of results)

1. Page 7, line 155-156: "424 (92.4%) were born in Hong Kong, where the water is fluoridated" - This relates with my previous comment regarding the link between birthplace and ECC.

2. The dmft score is a numerical data, hence its distribution should be shown in a histogram, not bar chart as shown in Figure 1.

3. Page 7, line 167-168: "Most of the children (84.3%) reported that they had stopped using bottle feeding before sleeping" - I think it was the parents who answered the questionnaire, not the children themselves. Please rephrase.

4. Page 7, line 168-169: "Many of the children (42.5%) snacked twice or more daily" - This relates with my comment earlier regarding snacking. As dentists, we are not concerned about the snacking habit itself but the food that the children take as snack. Children are growing, they must eat. They can't eat much in a single setting like adults do. Instead, they take small portion of meals but more frequently, which means children need to snack. So, it is more important for us to educate them about the correct choice of snack rather than 'penalise' them for having the habit.

5. Page 7, line 171-172: "A small number of the children (15.3%) adopted other cleansing aids, such as dental floss" - It surprising that 5-year-old children have started using dental floss. Deciduous dentition is normally spaced, and floss are thus not indicated unless in cases where the teeth were not spaced. Of these 70 children, how many actually used floss? And what other cleansing aids were used by the children? This relates with my
previous comment about how this variable was measured. Without clear explanation, the link between use of other cleansing aids and ECC is not appreciable.

Discussion

The discussion needs a major revision. Some of the arguments were weak and vague. The results were not adequately discussed and evidence used to support the argument/results was either not appropriate or not relevant.

1. Page 9, line 205: As previously commented, I think cluster is more appropriate to refer to the different geographical regions.

2. Page 10, line 239-240: The statement "In this study, the lower incisors had nursing liquid pool around them easily and thus were less affected by cariogenic bacteria" was erroneous and confusing. What is nursing liquid? And it is not the objective of this study to show the pooling of liquid around the incisors. I am not sure what the authors meant here.

3. Page 10, line 247-248: "The present study found an association between dental visit experience and caries severity as well as caries prevalence". Results on the association between dental visit experience and caries prevalence are shown in Table 2. Caries severity refers to mean dmft., and I could not find results on the association between dental visit experience and caries severity in the manuscript although the authors did mention about studying the distribution of dmft scores according to different variables using the Mann-Whitney U test, the Kruskal-Wallis test and the ANOVA. This relates with my previous comment.

Additionally, current discussion about the above findings (on pain and seeking behaviour) were not relevant because the author did not identify reasons for the visit (as previously commented). Instead, higher caries prevalence in children with experience of dental visit can probably be attributed to high number of ‘ft’ component, and this point was not highlighted
4. Page 11, line 254-256: "This study found that low monthly family income increased the risk of ECC, whereas high parental dental knowledge levels and having parents as the primary caregivers were factors that reduced the severity of ECC".

I think the authors should be more careful when interpreting the results of the statistical analysis. With regard to income, the reference category was HK$ ≤15,000 and the outcome was dmft=0 or caries free mouth. Results in Table 3 do not specifically show if low monthly family income increased the risk of ECC. Instead the findings should be interpreted as follows: children whose family income was more than HK$15,001 were more likely to have caries free mouth than children with family income of HK$ ≤15,000.

Likewise, the authors' interpretation that "high parental dental knowledge levels and having parents as the primary caregivers were factors that reduced the severity of ECC" must be reviewed. First, the authors must be very careful with the term used. Caries severity and caries experience refers to 2 different measurements and conditions. Caries experience is caries prevalence or dmft>0. It is a categorical variable. On the other hand, caries severity is mean dmft, a numerical variable. The analysis was done based on dmft<0, hence caries prevalence, not severity. Interpretation of the findings was also erroneous, comparison should be done against the reference group, not the other way around. The results can be interpreted as follows: children whose parents has moderate dental knowledge were more likely to have ECC than those whose parents has high dental knowledge.

I only highlighted some examples. I hope the authors will be able to detect and correct other similar issues in the rest of the discussion. The authors only discussed significant findings. Important factors that other authors have found to be significantly associated with ECC but not in this study, must also be explained. Perhaps this was attributed to the methods of data collection, particularly the questions.

Conclusion

1. I think it is wrong to conclude that most of the carious teeth were left untreated. This is a cross sectional study, and all data were obtained at one time only. The authors can say that carious tooth or 'dt' component was highest than others ('ft' and 'mt') in terms of contribution to the dmft score. Left untreated gives the impression that the tooth was examined twice - charted as 'dt' in the first examination and in the second examination it is still carious, thus it was left untreated.
Other

1. Quality of written English: The manuscript needs some language editing. Most of the errors are surrounding grammar and writing style. Some sentences need to be rephrased.

Thank you

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
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