Author’s response to reviews

Title: Inequalities in oral health among adolescents in Gangneung, South Korea

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Inequalities in oral health among adolescents in Gangneung city, South Korea

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BMC Oral Health

Please see our responses to the reviewers’ comments. We hope you agree with the changes below.

Yours sincerely,

Prof Jae-In Ryu
Noha Gomaa (Reviewer 1): This study assesses oral health inequalities among adolescents in Gangneung city in South Korea. The authors recruited 1267 participants from vocational and general schools, followed up for two years, after which they assessed the association between dental caries and SEP indicators, comparing baseline to follow-up. Assessing the determinants of oral health in an understudied rural population, particularly in adolescence is appreciated is of value and interest. It is important however, to take into consideration the study design, the analytical methods used in the current study and a number of points that need clarification, on which I have made the comments below, to help the authors with the revisions of their work.

Abstract:

- The abstract does not adequately reflect the methods used in the study, specifically in terms of the questionnaires used and outcomes assessed.

Response:

We changed the methods in abstract according to the reviewer’s suggestion as follows.

Chi-square tests and unconditional panel logistic regression were adopted to examine the associations between dental caries and SEP indicators.

→ Outcome measure for oral health was the existence of untreated dental caries (DT). As SEP indicators, school type (general vs. vocational), gender, father and mother’s education, perceived economic status, and FAS were measured. Variable to measure oral health related behaviours included tooth brushing frequency, frequency of eating snacks and drinking soda, smoking, and annual visits of dental clinics. Chi-square tests and panel logistic regression were adopted to examine the associations between dental caries and SEP indicators by STATA version 15.1.
Background:

- Line 12 and 13: The authors state that "However, there are arguments for the existence of health inequality in a specific life stage, the youth." This is too strong of a statement in my opinion. While there are known health inequalities across all age groups, the argument may be that whether the pattern differs across age groups.

Response:

We changed introduction according to the reviewer’s suggestion.

However, there are arguments for the existence of health inequality in a specific life stage, the youth.

→ However, there are diverse opinions for the existence of health inequality in a specific life stage, the youth.

Methods:

- Was the dental examiner calibrated? Was intra-examiner reliability measured? Please clarify.

Response:

We changed methods according to the reviewer’s suggestion.

Oral status was annually examined by one same dentist who trained according to the Korean National Oral Health Survey (KNOHS) every three years. To have reliable intra-examiner reliability the dentist examined 20 students before the main study. He re-examined them after one week for calibration and the kappa consistency was 0.91, good agreement [32].

- Were the surveys used in the study validated? Please report on that.
Response:

All the survey items were followed the national survey items in Korea or worldwide. We changed methods according to the reviewer’s suggestion.

Outcome measure for oral health was the untreated dental caries following the standard of the Korean National Oral Health Survey (KNOHS) which established by the guideline of WHO methods for oral health survey [35]. The untreated dental caries “D” component, which includes carious teeth, filled teeth with recurrent decay, teeth with only root left, defective filling with caries, temporary filling and teeth with a filled tooth surfaces but with other surface decayed.

Self-administered questionnaire surveys were done, of which items were derived from the Korean Youth Risk Behaviour Web-based Survey (KYRBWS) and the guidelines in “Delivering better oral health: an evidence-based toolkit for prevention” [36]. As SEP indicators, school type (general vs. vocational), father and mother’s education, perceived economic status, and FAS were measured.

- The authors state that the schools included in the study were randomly selected. Please clarify how this randomization took place.

Response:

We changed methods according to the reviewer’s suggestion.

The city of Gangneung has eleven high schools with a total of 3,070 students; six general schools, four vocational schools, and one art school [25]. The aim of the general schools is to support students’ academic development and entry into college. By contrast, the aim of the vocational schools is to prepare students to enter the workforce directly after graduation. All four vocational schools and three general schools which were randomly selected were included in the study, while excluding one art school due to its unique environment.
The aim of this panel study was to explore the inequality of adolescent in oral health, especially in the rate of untreated dental caries. The city of Gangneung has eleven high schools; two in rural and nine in urban area [34]. By the school types, there were six general schools, four vocational schools, and one art school. The aim of the general schools is to support students’ academic development and entry into college. By contrast, the aim of the vocational schools is to prepare students to enter the workforce directly after graduation. One art school in this study excluded due to its unique environment. Firstly, the schools were categorized by its’ location as urban or rural area. There was only one general and one vocational school in rural area so all of them were recruited. Among the other eight schools in urban area, three vocational schools and two general schools were selected as study samples. Because there was fewer student rather than general school, all vocational school were recruited. Two schools in general type were randomly selected by distance which is close to sampled vocational schools. All first grade students were invited to participate, considering follow-up for the next two years.

- Was a sample size calculation conducted? The authors should elaborate on why they think (or not) their sample is representative of Gangneung's adolescent population.

Response:

We changed methods according to the reviewer’s suggestion.

The city of Gangneung has eleven high schools with a total of 3,070 students; six general schools, four vocational schools, and one art school [25]. The aim of the general schools is to support students’ academic development and entry into college. By contrast, the aim of the vocational schools is to prepare students to enter the workforce directly after graduation. All four vocational schools and three general schools which were randomly selected were included in the study, while excluding one art school due to its unique environment.

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vocational schools, and one art school. The aim of the general schools is to support students’ academic development and entry into college. By contrast, the aim of the vocational schools is to prepare students to enter the workforce directly after graduation. One art school in this study excluded due to its unique environment. Firstly, the schools were categorized by its’ location as urban or rural area. There was only one general and one vocational school in rural area so all of them were recruited. Among the other eight schools in urban area, three vocational schools and two general schools were selected as study samples. Because there was fewer student rather than general school, all vocational school were recruited. Two schools in general type were randomly selected by distance which is close to sampled vocational schools. All first grade students were invited to participate, considering follow-up for the next two years.

- The details of how the dental examination took place need to be elaborated on. For example, what kind of lighting and dental instruments were used? What kind of lesions were considered as carious?

Response:

We changed methods according to the reviewer’s suggestion.

Outcome measure for oral health was the existence of untreated dental caries and caries experiences (decayed, missing, or filled teeth), which was annually examined by one same dentist who trained according to the Korean National Oral Health Survey (KNOHS).

→ Outcome measure for oral health was the untreated dental caries following the standard of the Korean National Oral Health Survey (KNOHS) which established by the guideline of WHO methods for oral health survey [35]. The untreated dental caries “D” component, which includes carious teeth, filled teeth with recurrent decay, teeth with only root left, defective filling with caries, temporary filling and teeth with a filled tooth surfaces but with other surface decayed.

The examinations were conducted in the classroom of the surveyed schools using their table and chairs with a lightweight portable examination light. The plane mouth mirrors, periodontal
probes which conform to WHO specifications, and several pairs of tweezers were supplied for the survey.

- It is not quite clear how the authors operationalized the outcomes used in the study. It is stated that dental caries was used as "any experience of decayed, missing or filled teeth", however there is reference to using untreated dental caries in the results section.

Response:

It might need to be corrected to make clear as reviewer commented. Dental caries means the diseased status of oral health with untreated condition. So we deleted all the results of DMFT index in tables and results according to the reviewer’s suggestion. The details of the correction was displayed in the next response.

- Using untreated decayed teeth would be more rational, especially for follow-up, since the authors consider receiving treatment as transitioning from yes (disease) to no (no disease). Therefore filled/treated teeth should not be included in the count of teeth with dental caries (i.e. DMFT should not be used) at baseline.

Response:

It might need to be corrected to make clear as reviewer commented. Dental caries means the diseased status of oral health with untreated condition. So we deleted all the results of DMFT index in tables and results according to the reviewer’s suggestion. The details of the correction was displayed in the following sections.

At both waves, the students who were boys, from vocational schools and less educated parents, and ‘low’ groups of perceived economic status and FAS were more likely to have untreated dental caries. All the differences were statistically significant, except for the case of mother’s education. However, DMF rates were not different between socioeconomic groups except for the
case of gender and father’s education; girls and students with less educated fathers were more likely to experience DMF teeth. As for oral health behaviours, tooth brushing was inversely associated with D rates but not with DMF rates. Annual visits to dental clinics were associated with lower D rates and higher DMF rates. Smoking was associated with D rates as well as DMF rates in both waves (Table 2).

At both waves, the students who were boys, from vocational schools and less educated parents, and ‘low’ groups of perceived economic status and FAS were more likely to have untreated dental caries. All the differences were statistically significant, except for the case of mother’s education. As for oral health behaviours, tooth brushing and annual visits were inversely associated with D rates. Smoking was strongly associated with D rates in both waves (Table 2).

Table 2 Prevalence (%) of untreated dental caries (D rate) and experience of dental caries (DMF rate) by survey year

The odds ratios (ORs) for untreated caries or caries experiences were estimated before and after adjusting for SEP indicators and covariates (Table 3). As for D rates, fathers’ education and school type remained significant after controlling for other SEP indicators. Even after incorporating health behaviour variables in the models, they still showed significant effects with attenuation. In case of DMF rates, gender was the most prominent predictor. Fathers’ education was also significant but school type was not significant any more. Annual visits to dental clinics were strong predictor for DMF rates.

The odds ratios (ORs) for untreated caries or caries experiences were estimated before and after adjusting for SEP indicators and covariates (Table 3). As for D rates, fathers’ education and school type remained significant after controlling for other SEP indicators. Even after
incorporating health behaviour variables in the models, they still showed significant effects with attenuation.

Table 3 Adjusted odds ratio and 95% confidence intervals estimated from unconditional panel logistic regression models for D rate and DMF rate

→ Table 3 Adjusted odds ratio and 95% confidence intervals estimated from unconditional panel logistic regression models for D rate

- Similarly, if filled teeth is included in the "dental caries experience" count at baseline, this would affect the outcome at follow-up (as staying unhealthy), if the participant had the same number of filled teeth or more. I suggest the authors examine decayed, missing and filled teeth separately.

Response:

It might need to be corrected to make clear as reviewer commented. Dental caries means the diseased status of oral health with untreated condition. So we deleted all the results of DMFT index in tables and results according to the reviewer’s suggestion. The details of the correction was displayed in the above sections.

- When assessing missing teeth, have the authors inquired about history of trauma, teeth removed for orthodontic purposes, etc.? If not, they should elaborate on this as a limitation of including missing teeth in the caries experience.

Response:

It might need to be corrected to make clear as reviewer commented. Dental caries means the diseased status of oral health with untreated condition. So we left only the result related with untreated dental caries and deleted all the other results such as DMFT index in tables and results
according to the reviewer’s suggestion. The details of the correction was displayed in the above sections.

- Gender should not be referred to as an SEP indicator. (line 10, page 6)

Response:

We changed the methods according to the reviewer’s suggestion.

As SEP indicators, school type (general vs. vocational), gender, parents’ education, perceived economic status, and FAS were measured.

→ As SEP indicators, school type (general vs. vocational), father and mother’s education, perceived economic status, and FAS were measured.

- Table 1 should be reported on in the results section as 'characteristics of study participants'.

Response:

We changed the results according to the reviewer’s suggestion.

Finally, 1,267 students were enrolled into the panel (Table 1). At the baseline survey of 2011, the participation rate was 92.4%, and the follow-up rate was 84.7% in 2013 with the drop of 194 students. Attrition was more common in vocational schools (27.3%) than general schools (7.4%). Although such difference was statistically significant (p<0.05), this did not present significant changes in the distribution of gender and SEP indicators of the sample between waves.

→ The characteristics of the study participants were displayed in the Table 1. At the baseline survey of 2011, the participation rate was 92.4% and 1,267 students were participated in total. The follow-up rate was 84.7% in 2013 with the drop of 194 students. Attrition was more
common in vocational schools (27.3%) than general schools (7.4%). However, this did not present significant changes in the distribution of gender and SEP indicators of the sample between waves (additional Table in supplementary file).

- Table 1 indicates urban for some of the school locations, yet, the city Gangneung has been described as a rural city. Please clarify whether all schools were within the city of interest.

Response:

We changed background according to the reviewer’s suggestion.

This study aims to evaluate inequality in oral health among adolescents by various SEP indicators and to explain the mechanisms of such inequalities in Gangneung, a city in South Korea.

→ This study aims to evaluate inequality in oral health among adolescents by various SEP indicators and to explain the mechanisms of such inequalities in Gangneung, a rural city in South Korea.

- Is there supporting literature in the Korean context on the socioeconomic differences between families opting for vocational versus general schools that would support the authors' choice of 'type of schooling' being an SEP indicator?

Response:

There were some studies revealed that there are some relationship between unhealthy behaviour such as smoking with the type of schools. We added more references in the background section according to the reviewer’s suggestion.
Along this line, a group of scholars have focused on school characteristics as an alternative to traditional SEP indicators to determine health inequalities in adolescents [19-22].

→ Meanwhile, other group of scholars have focused on school characteristics as an alternative to traditional SEP indicators [24-27] or influential effectors to behaviour especially in S. Korea [28, 29] to determine health inequalities in adolescents.

- It is unclear from the wording whether parents' education refers to maternal or paternal education. Please elaborate on this in the methods section, specifying how this was measured.

Response:

We agreed with your opinion about parent’s education which might confused as father or mother in the sentences. So we changed the words according to the reviewer’s suggestion.

Abstract

Chi-square tests and unconditional panel logistic regression were adopted to examine the associations between dental caries and SEP indicators.

→ Outcome measure for oral health was the existence of untreated dental caries (DT). As SEP indicators, school type (general vs. vocational), gender, father and mother’s education, perceived economic status, and FAS were measured.

Methods

As SEP indicators, school type (general vs. vocational), gender, parents’ education, perceived economic status, and FAS were measured. Parents’ education level was categorized into two groups; high school graduation or below vs. college graduation or above.
As SEP indicators, school type (general vs. vocational), father and mother’s education, perceived economic status, and FAS were measured. Father and mother’s education level was categorized into two groups; high school graduation or below vs. college graduation or above.

How was perceived economic status measured? Please explain.

Response:

We inserted the following sentence in the methods according to the reviewer’s suggestion.

The perceived economic status were re-categorised as high (high, high-middle, and middle) vs. low (middle-low and low).

Operationalization of oral health behaviours: the frequency of snacking and soda may be better dichotomized as "yes or no". What did the authors mean by "yes or no" for annual dental visits? Visiting the dentist at least once a year? Please clarify.

Response:

We changed the methods according to the reviewer’s suggestion.

Variable to measure oral health related behaviours included tooth brushing frequency (‘less than twice a day’ vs. ‘twice or more a day’), frequency of eating snacks and drinking soda (‘less than once a day’ vs. ‘once or more a day’), smoking (‘yes’ vs. ‘no’), and annual visits of dental clinics (‘yes’ or ‘no’).

Variable to measure oral health related behaviours included tooth brushing frequency (‘less than twice a day’ vs. ‘twice or more a day’), frequency of eating snacks and drinking soda (‘less than once a day’ vs. ‘once or more a day’), smoking (‘yes’ vs. ‘no’), and annual visits of dental clinics at least once a year (‘yes’ or ‘no’).
• Usually, due to the high number of zeros in DMFT or dental caries generally, negative binomial regressions or Zero-inflated Poisson are used. Also, why wasn't a survival analysis conducted to determine whether participants remained caries-free over the two-year period? The authors need to clarify why they opted for their statistical methods, and further explain how these were conducted.

Response:

We used the panel study for this study so the panel logistic regression models were used for the statistical analysis. It might need to add some more information for the analysis. We changed titles of tables according to the reviewer’s suggestion.

Annual prevalence of untreated caries (decayed teeth; ‘D rate’), and caries experience (decayed, missing, and filled teeth; ‘DMF rate’), and proportion of status transition in dental caries over the follow-up was examined according to various SEP indicators by chi-square tests. In order to identify independent effects of SEP variables and contributions of covariates to oral health status with considering panel design, unconditional panel logistic regression models were estimated.

→ Annual prevalence of untreated caries (decayed teeth; ‘D rate’) and proportion of status transition in dental caries over the follow-up was examined according to various SEP indicators by chi-square tests. In order to identify independent effects of SEP variables and contributions of covariates to oral health status with considering panel design, unconditional panel logistic regression models were estimated. Data analysis was carried out using STATA version 15.1 statistical software package (StataCorp, Texas).

Results:

• The symbol † in the legend for table 2 has no corresponding meaning within the table.

Response:

We changed the legend of tables according to the reviewer’s suggestion.
† obtained by chi-square test; *p < 0.05, ** p < 0.01, ***p < 0.001.

→ *p < 0.05, ** p < 0.01, ***p < 0.001.

- Table 3. It is unclear whether these results are reported from baseline or follow-up data.

Response:

We used the unconditional panel logistic regression with STATA which used baseline and follow-up data together. We changed the methods according to the reviewer’s suggestion.

In order to identify independent effects of SEP variables and contributions of covariates to oral health status with considering panel design, unconditional panel logistic regression models were estimated.

→ In order to identify independent effects of SEP variables and contributions of covariates to oral health status with considering panel design, unconditional panel logistic regression models were estimated. Data analysis was carried out using STATA version 15.1 statistical software package (StataCorp, Texas).

- The headings for table 4 are not clear. I would suggest changing No→No as remaining caries-free; No→Yes as developing dental caries; etc. or providing the explanation in the legend. Also, it is not common to put statistical significance as a separate column. I would suggest putting the asterisk for statistical significance in the same columns as N (%), where applicable.

Response:

We changed the legend of tables according to the reviewer’s suggestion.

1 No → No as remaining caries-free, 2 Yes → No as being treated with fillings, 3 No → Yes as developing dental caries, and 4 Yes → Yes as remaining caries
The statistical significance was tested by chi-square as two by four, socioeconomic variables by four difference caries status change.

Discussion:

- Line 22 (pg 11): It is quite unclear what the authors intend to state. The authors state that "Female students were found to have almost three times the chance to experience DMF teeth than male students, while there was no significant difference in untreated dental caries." This statement implies that the high DMFT in girls is due to the M and F components. However the authors continue to support their findings by stating "This adheres to findings in the 2012 Korean National Oral Health Survey, which showed higher prevalence of decayed teeth among girls by 10.6%". On the contrary, this might imply that females get more timely treatment than male students. This should be sufficiently elaborated on in the discussion.

Response:

It might need to be corrected to make clear as reviewer commented. Dental caries means the diseased status of oral health with untreated condition. So we deleted all the results of DMFT index in tables and results according to the reviewer’s suggestion. The details of the correction was displayed in the above response.

Quality of written English:

- The manuscript will need extensive edits and revisions before it is suitable for publication.

Response:

We revised and corrected the sentences according to the reviewer’s suggestion.
aswathikutty gireesh (Reviewer 2): This study evaluates the inequalities in oral health among adolescents in South Korea and clearly the evidence serves as an important addition to develop a more coherent health policy network. These are the suggestions I have got to further improve it:

- Although, the literature review has covered several areas, it is insufficient. As the main aim of the study is to look at inequalities in terms of different indicators, it is highly recommended to review the existing evidence on each SES indicators in adolescents more clearly, especially with regard to the settings (See lines 36-38).

The second paragraph focuses mainly on the different indicators of SEP, but not explicitly stated whether previous studies have found different results by using different measures of SEP. This is important to identify the missing pieces in the previous literature.

Response:

We inserted following sentences according to the reviewer’s suggestion.

Recently there are some studies dealing with inequality in oral health in adolescent by SEP indicators even in longitudinal studies. A life-course research in cohort of New Zealand children concluded that there was an effect from childhood SEP [19]. The study from Sweden showed that there is limited effect from SEP only after considering the previous experience of caries [20]. Polk et al [21] and Newacheck [22] also reported that there was a SEP gradient in caries experiences in U.S. Another longitudinal studies from Iowa cohort revealed that there is gap by SEP, especially maternal educational level [23]. However recently Curtis who use the same cohort data from Iowa Fluoride Study (IFS) argued that ‘the role of SES in caries may not be as important as previously thought’.

- Another concern is about this, “Although such difference was statistically significant (p<0.05), this did not present significant changes in the distribution of gender and SEP indicators of the
sample between waves”. For further review, please provide an additional file in the supplementary section containing the tables with difference between the groups in two waves.

Response:

We inserted an additional table in the supplementary section according to the reviewer’s suggestion.

Additional Table 1 The characteristics of the participants by sociodemographic information from 2011 to 2013

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>1267(100.0)</td>
<td>1073(100.0)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>690(54.5)</td>
<td>566(52.8)</td>
</tr>
<tr>
<td>Boys</td>
<td>577(45.5)</td>
<td>507(42.3)</td>
</tr>
<tr>
<td>School type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>766(60.5)</td>
<td>709(66.1)</td>
</tr>
<tr>
<td>Vocational</td>
<td>501(39.5)</td>
<td>364(33.9)</td>
</tr>
<tr>
<td>Father’s education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College or above</td>
<td>476(40.8)</td>
<td>427(42.5)</td>
</tr>
<tr>
<td>High school or below</td>
<td>691(59.2)</td>
<td>577(57.5)</td>
</tr>
<tr>
<td>Mother’s education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College or above</td>
<td>346(29.8)</td>
<td>301(30.0)</td>
</tr>
<tr>
<td>High school or below</td>
<td>814(70.2)</td>
<td>701(70.0)</td>
</tr>
<tr>
<td>Perceived economic status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>930(73.4)</td>
<td>788(73.7)</td>
</tr>
<tr>
<td>Low</td>
<td>337(26.6)</td>
<td>281(26.3)</td>
</tr>
</tbody>
</table>
The city of Gangneung has eleven high schools with a total of 3,070 students; six general schools, four vocational schools, and one art school [25]. The aim of the general schools is to support students’ academic development and entry into college. By contrast, the aim of the vocational schools is to prepare students to enter the workforce directly after graduation. All four vocational schools and three general schools which were randomly selected were included in the study, while excluding one art school due to its unique environment. Only the first grade students were invited to participate, considering follow-up for the next two years. The research team sent the consent forms for oral examinations and surveys to students’ parents with a brief introduction. Only students who returned completed consent forms were included in the study. Among 1,371 students, 97 declined to participate and seven more were excluded due to incompletely answered questionnaires. Finally, 1,267 students were enrolled into the panel (Table 1). At the baseline survey of 2011, the participation rate was 92.4%, and the follow-up rate was 84.7% in 2013 with the drop of 194 students. Attrition was more common in vocational schools (27.3%) than general schools (7.4%). Although such difference was statistically significant (p<0.05), this did not present significant changes in the distribution of gender and SEP indicators of the sample between waves.
The aim of this panel study was to explore the inequality of adolescent in oral health, especially in the rate of untreated dental caries. The city of Gangneung has eleven high schools; two in rural and nine in urban area [32]. By the school types, there were six general schools, four vocational schools, and one art school. The aim of the general schools is to support students’ academic development and entry into college. By contrast, the aim of the vocational schools is to prepare students to enter the workforce directly after graduation. One art school in this study excluded due to its unique environment. Firstly, the schools were categorized by its’ location as urban or rural area. There was only one general and one vocational school in rural area so all of them were recruited. Among the other eight schools in urban area, three vocational schools and two general schools were selected as study samples. Because there was fewer student rather than general school, all vocational school were recruited. Two schools in general type were randomly selected by distance which is close to sampled vocational schools. All first grade students were invited to participate, considering follow-up for the next two years. The education in middle school is mandatory in S. Korea, so the age of freshman in high school is sixteen. The research team sent the consent forms for oral examinations and surveys to students’ parents with a brief introduction. Only students who returned completed consent forms were included in the study. Among 1,371 students, 97 declined to participate and seven more were excluded due to incompletely answered questionnaires. Finally, 1,267 students were enrolled into the panel.

- It is advised to provide more information about the covariates (frequency of tooth brushing, eating snacks, and drinking soda, smoking, and annual visits to dental clinics) and analysis done, rather than just mentioning them under the tables.

Another potential source of bias is self-reported measures and there is no discussion about the reliability levels of questionnaires used.

Response:

We changed some of the words in methods according to the reviewer’s suggestion.
Variable to measure oral health related behaviours included tooth brushing frequency (‘less than twice a day’ vs. ‘twice or more a day’), frequency of eating snacks and drinking soda (‘less than once a day’ vs. ‘once or more a day’), smoking (‘yes’ vs. ‘no’), and annual visits of dental clinics at least once a year (‘yes’ or ‘no’).

- Adolescents can fall into wide age range stretching into the early twenties, however, the age group of study participants are not stated. Differences in age distributions could affect results.

Response:

We inserted following sentences in methods according to the reviewer’s suggestion.

All first grade students were invited to participate, considering follow-up for the next two years. The education in middle school is mandatory in S. Korea, so the age of freshman in high school is sixteen.

- All these recommendations need to be addressed before publication.

Response:

We corrected and replied all the points according to the reviewer’s suggestion.