Author’s response to reviews

Title: Hierarchizing caries risk factors among first-year university students in Nice (France): a cross-sectional study

Authors:

Romain CEINOS (Romain.Ceinos@unice.fr)
Marie-France BERTRAND (Marie-France.Bertrand@unice.fr)
Céline CUCCHI (celine.cucchi@gmail.com)
Laurence LUPI (lupi@unice.fr)

Version: 2 Date: 15 Aug 2017

Author’s response to reviews:

RESPONSE TO EDITOR COMMENTS

Dear Editor,

Thank you very much for your comments. We have attempted to take all your remarks into account in the revised version of our manuscript. Our responses are provided below.

Abstract

QUESTION

The authors noted: We assessed the oral status, the oral hygiene habits and the daily health-related behaviours. Once again, specificity is required. Please what specific oral health status, oral hygiene habits and health-related behaviours were assessed?

ANSWER

All specific measured variables were added to the abstract.

Page 2 - Lines 32-38:

“We assessed the volunteers' oral hygiene habits (daily toothbrushing frequency, type of toothbrush used, frequency of toothbrush replacement, place of toothpaste purchase, and flossing), daily health-related behaviors (diet-related and addictive behaviors), oral-health-related behaviors (self-reported oral health, dental visits during the past year, reason for the last dental
consultation, and failure to seek dental care due to financial reasons), and oral health issues (dental crowding, Silness-Löe plaque index, calculus index, community periodontal index of treatment needs CPITN, presence of pit and fissure sealant remnants, presence of restorative care, and DMFT index).”

QUESTION

Secondly, the factors identified as pejorative and protective caries risk factors were not identified as variables to be measured in the method section. For example, failure to seek dental care due to financial reasons is not related to oral status, the oral hygiene habits nor the daily health-related behaviours. Please for the purpose of clarity and reproducibility, can the measures be specific.

ANSWER

All specific measured variables were added to the abstract.

Page 2 - Lines 32-38:

“We assessed the volunteers' oral hygiene habits (daily toothbrushing frequency, type of toothbrush used, frequency of toothbrush replacement, place of toothpaste purchase, and flossing), daily health-related behaviors (diet-related and addictive behaviors), oral-health-related behaviors (self-reported oral health, dental visits during the past year, reason for the last dental consultation, and failure to seek dental care due to financial reasons), and oral health issues (dental crowding, Silness-Löe plaque index, calculus index, community periodontal index of treatment needs CPITN, presence of pit and fissure sealant remnants, presence of restorative care, and DMFT index).”

QUESTION

Third, the authors concluded that the most important obstacle to dental consultation is the financial barrier. I suggest the statement be rephrased to read as: the highest-ranking caries risk factor for the study population was financial barrier.

ANSWER

The sentence in the conclusion was modified.

Page 2 - Lines 50-51:

“The highest-ranking caries risk factor for the study population was the financial barrier.”

Background
Please include references for these statements: Caries is related to one’s lifestyle, and behavioural factors under a person’s control are clearly implicated [refs]. These factors include poor oral hygiene [refs] and poor dietary habits [refs]. Other factors related to caries risk include socio-economic status [ref]; non-use of dental sealants [ref]; dental crowding [ref].

References were included.

Page 3 - Lines 63-69:

“Caries is related to one’s lifestyle, and behavioral factors under a person’s control are clearly implicated [3-6]. These factors include poor oral hygiene [7-9] and poor dietary habits [10-13]. Other factors related to caries risk include socio-economic status [3, 5, 6], the use of dental sealants [14, 15], and dental crowding, which promotes plaque retention and increases the difficulty of maintaining good oral hygiene [16].”

Please include references for the few studies mentioned in this statement: Few researchers have studied the oral hygiene habits, health-related behaviours and oral health of university students [ref].

The sub-chapter was modified and this sentence was removed.

Please include references for this statement: Yet, in France, they often leave their family for the first time in order to study in a university that sometimes is far from home [ref].

Reference was added.

Page 4 - Lines 90-91:

“However, in France, university students often leave their family for the first time to study at a university that occasionally is far from home [38].”
QUESTION

This background is still missing on a conceptual framework – why do we need to study oral hygiene habits, health-related behaviours and oral health of undergraduate university students? How are the independent variables linked to the dependent variable(s) of this study? The first two paragraphs are beautifully linked. They kind of link you to the focus of the study – dental caries. The third paragraph then throws everyone off the balance by introducing discussion on oral hygiene habits, health-related behaviours and oral health of university students without linking this to caries. I would suggest that the third paragraph should discuss the risk factors for caries in undergraduate dental students. The fourth paragraph should highlight the studies conducted about undergraduate students all over the world in general that for France and that conducted on caries for undergraduate students in France. You then justify the need for the study (the gap) and the study objective. This would introduce readers to the variables you want to study and why you want to study them.

ANSWER

The end of the “Background” section was modified to better focus this introduction on dental caries and risk factors for caries in undergraduate students, to introduce numerous references from all over the world and to reveal the lack of data in France for this specific population.

Page 3&4 - Lines 70-89:

“Numerous studies performed among undergraduate students have concerned dental students [17] but have less often studied the general university student population. However, dental students constitute a selected minority that is clearly demarcated from students of other disciplines regarding a higher awareness of self-reliant oral hygiene [17]. The DMFT score of undergraduate students has been the object of studies in various universities worldwide, e.g., 4.1 ± 3.1 at Sana’a University in 2013 (Yemen) [18], 3.9 ± 3.9 at San Luis Potosí University in 2009 (Mexico) [19], 2.9 ± 3.3 at Helsinki University in 2006 (Finland) [20], 2.0 ± 2.9 at Okayama University in 2014 (Japan) [21], and 1.2 ± 2.0 at Nice Sophia Antipolis University in 2012 (France) [22].

Healthy dietary habits and good oral hygiene are critical for the prevention of caries and the maintenance of good oral health [23]. In Lebanon, 65% of undergraduate students reported brushing their teeth at least twice per day [24], while that percentage was 68% in Turkey [25], 74% in the USA [26], 87% in Japan [27], and 92% in Italy [28] and France [22]. Of subjects in Turkey, 91% reported never flossing versus 87% in Japan, 80% in France, 72% in Lebanon, 35% in Italy and 20% in the USA. Of the students in France and Italy, 62% and 60%, respectively, reported visiting a dentist during the previous year, while these percentages were only 31% in Lebanon and 30% in Turkey. High sugar consumption has long been linked to dental caries [29]. A quarter of USA Midwestern university students reported eating sugary foods (including foods and drinks, such as candies, soft drinks, juices, doughnuts, jellies, etc.) more than once daily. Among the 89% of students who reported drinking pop, 69% selected regular pop as their favorite as opposed to diet pop [26].
Smoking habits may also be associated with a higher risk of dental caries [30]. Self-reported use of tobacco among adolescents was significantly associated with an increased incidence of dental caries over a 3-year period [31]. This association was also apparent with alcohol [32, 33, 34] and drug abuse [35, 36, 37].”

Methodology

QUESTION

The authors noted - A cross-sectional descriptive epidemiological study… This is not a descriptive study. I suggest the statement reads as a cross-sectional study.

ANSWER

The term “descriptive” was removed.

Page 4 - Line 105:

“A cross-sectional epidemiological study was conducted at the Côte d’Azur University.”

QUESTION

Please include information on the inclusion and exclusion criteria for the study in the write up. If all first-year undergraduate students were all eligible for the screening exercise with no exclusion criteria, please state this categorically in the manuscript.

ANSWER

All first-year undergraduate students were eligible for the dental consultation with no exclusion criteria. This sentence was added to the “Methods” section in the “Recruitment procedure” sub-section.

Page 5 - Line 126:

“…All students were eligible for the study with no exclusion criteria…”

QUESTION

Please include a section on the recruitment procedure. How were the students informed about the screening? Where they expected to turn up at a screening point over a specific period? These details are important in other to identify if the sample is biased in anyway.

ANSWER
The students were informed about the possibility of benefiting from a dental consultation during
the previous medical examination. If they agreed, the dental consultation took place at the same
visit in the same place. Details have been provided in the “Methods” section via the addition of a
“Recruitment procedure” sub-section.

Page 5 - Line 124-130:

“Recruitment procedure

Participation in the study was proposed to all first-year undergraduate students who attended the
medical examination in the first half of 2015. All students were eligible for the study with no
exclusion criteria. After information on the objectives of the study was provided and the
student’s consent was obtained, information was collected through an interview and an oral
examination. The interview and oral examination were immediately conducted in the unit for
medical examination in the university department of preventive medicine, which was adapted for
this purpose.”

QUESTION

This section should then be followed with the description of the data collection tools. Please
include the information on whether the tool was adapted or developed here. If developed, please
discuss how the reliability, content validity and construct validity of the instrument used to
collect the variables for this study was conducted. If this was not done, please identify this as a
limitation.

ANSWER

We specified the recognized and standardized indices used for the oral examination. These
indices had previously not been described to avoid weighing down this section because the data
were then transformed into dichotomous variables for the statistical analysis.

Page 6 - Line 151-164:

“The oral examination assessed dental crowding by measuring the most crowded arch (no
crowding between 0 and 2 mm, mild or moderate crowding between 2.1 and 7.0 mm, and severe
crowding more than 7 mm) [43], periodontal status using the Community Periodontal Index of
Treatment Needs (CPITN) (0: no signs of disease; 1: gingival bleeding after gentle probing; 2:
presence of supra or subgingival calculus; 3: shallow pockets of 4-5 mm; and 4: pockets of 6 mm
or more), oral hygiene using the Silness-Löe plaque index plaque index (0: no observable plaque;
1: a thin film of plaque detected at the gingival margin by running a probe across the tooth
surfaces; 2: a moderate amount of plaque detected along the gingival margin with plaque visible
clinically; and 3: heavy plaque accumulation detected at the gingival margin and in the
interdental spaces), the calculus index (0: no observable calculus; 1: scattered calculus covering
less than 1/3 of the buccal surface of the tooth; 2: calculus covering between one- and two-thirds
of the buccal tooth surface with minimal subgingival calculus; and 3: calculus covering greater
than two-thirds of the buccal tooth surface and extending subgingivally), the presence or absence of pit and fissure sealant remnants, the presence or absence of restorative care, and the DMFT index ( decayed, missing, or filled teeth; only cavitated carious lesions were considered in this screening situation).”

QUESTION

Please include the results of the inter- and intra-operators reliability tests

ANSWER

Numerous calculations of Cohen’s kappa and intra-class correlation coefficients were conducted during the tutorial sessions for all of the variables. We have followed your suggestion and included the following sentence:

Page 5 - Lines 120-122:

“Each operator was trained and became eligible for the study if all of the calculated Cohen kappa values (for qualitative variables) and intra-class correlation coefficients (for quantitative variables) exhibited minimum acceptable inter- and intra-operator agreement of more than 0.80.”

QUESTION

Please describe study procedure. How was caries status assessed – in the clinic or in the open space? Was the teeth cleaned of debris or not? Was a probe used to assess stickiness?

ANSWER

The conditions of the interview and the examination were specified. A closed room was equipped with a dentist chair to preserve the confidentiality of the interview and the examination. Appropriate dental lighting was a part of the unit. Disposable periodontal examination kits with probes, mirror and cotton rolls were used, as were masks and disposable gloves. It was thus possible to dry the dental surfaces, to sound, and to make measures but not to clean the teeth because there was no rotating instrumentation.

Page 5 - Lines 133-135:

“A closed room was equipped with a dentist chair to protect the confidentiality of the interview and the examination. Appropriate dental lighting was a part of the unit. Disposable periodontal examination kits with a probe, mirror and cotton rolls were used, as were masks and disposable gloves.”

QUESTION
How was the periodontal status accessed (was a tested index used to assess this)? How did you determine a student had gingival health or mild periodontal disease? How was crowding assessed and what criteria was used to grade crowding? Please note that if standard measures were not used to assess these parameters, please identify this as a limitation of the study. This is important as it reduces comparability of data.

ANSWER

Standardized and recognized tools were used for all of the data: the CPITN was used for the periodontal status, the Silness-Löe plaque index and the calculus index were used for oral hygiene, and the crowding index with an appropriate reference was used for crowding.

Page 6 - Lines 151-164

QUESTION

One evidence of poor content validity for the tool used for this study is the bias of the tool in identifying reason for failing to seek dental care. 369 students did not visit the dental clinic last year but only 34 failed because of financial reasons. Why did this tool only explore a single reason for failure to visit the dental clinic? Why does this tool explore the reason from all students including those that actually visited within the last 12 months? Although the authors showed that the tool had been used in prior studies (5-7), there is no evidence of content and construct validity of the tool.

ANSWER

1. The study does not concern the use of dental services but, rather, the risk factors for caries. We did not attempt to identify all of the reasons why the students did not go to the dentist; rather, we sought to determine whether the financial barrier evoked in the national report of 2006 is actually a real caries risk factor. Our study did confirm this. This was a closed question with only two possible answers: yes or no.

2. The use of dental services during the last year and the failure to seek dental care due to financial reasons are not necessarily linked. The fact that an individual has not gone to the dentist during the last year does not necessarily mean they have given up such visits. It is also possible to go to the dentist but forgo expensive care.

3. The question “Did you already fail to seek dental care for financial reasons?” is a recognized and systematically used question in all our National Inquiries of Health (for example: Enquête Handicap-Santé-Ménages 2008, Enquête Santé Protection Sociale 2014).

QUESTION

There are also several indications that suggest the reliability of the measures. For example, how do you ensure consistency of response based on variability of interpretation on ‘NUMBER OF
SNACKS IN-BETWEEN MEALS’. Is this the number of times snacks is taken or the number of the sachets of biscuits or the number of the difference snacks taken? I suggest the authors identify this as a limitation of the study.

ANSWER

It is the number of times a snack is taken. The question was well explained to the respondent when the interview was conducted, and there was no ambiguity. This was the situation for all the questions. The operators were trained to avoid any ambiguity in the questions and thus avoid variability in understanding before answering on the part of the subject (closed questions).

Page 6 – Line 143:

“…number of snacks between meals… »

Results

QUESTION

The table 3 shows that the authors dichotomized a number of variables – area of study, profession, accommodation, Reason of last dental consultation. This was not discussed in the methodology section.

ANSWER

We added this sub-chapter in the « Methods » section:

Page 6 – Lines 168-174:

“The independent variables with more than two categories were dichotomized as follows for the statistical analyses: Health/Sport area of study vs others, father’s profession in management vs others, mother’s profession in management vs others, at least 3 main meals per day vs less than 3 main meals per day, at most one snack per day vs more than one snack per day, no daily soft drink consumption vs daily consumption, toothbrushing at least twice per day vs less than twice per day, daily alcohol consumption vs no daily consumption, and preventive reason for the last dental consultation vs curative or unknown reason.”

QUESTION

The variables listed in table 3 also indicates the risk for confounders. For example, Poor oral hygiene is a risk factor for periodontal disease. Both would have moved into the multivariate logistic regression model in this case. In this case, the regression analysis must demonstrate that these confounders were addressed. But then, if n periodontal index was used to assess gingival health, these would have been addressed.
We agree with you. Both periodontal status (p = 0.020 in univariate analysis) and poor oral hygiene (p < 0.001) were included in the multivariate logistic regression model, and only poor oral hygiene remained a proven risk factor. The main advantage of the multivariate analysis is the avoidance of confounding effects caused by the analysis of the associations of all of the variables together. The following sentence was added in the “Discussion” chapter:

Page 9&10 – Lines 243-246:

“Both periodontal status and poor oral hygiene were included in the multivariate logistic regression model, and only poor oral hygiene remained a proven risk factor. The main advantage of the multivariate analysis was thus to avoid confounding effects that arise by analyzing the associations of all variables together.

Please include a table for the logistic regression.

Table 4 was added.

Please move all tables to the end of the manuscript as required by the journal.

All the tables were moved to the end of the manuscript.

Your entire method had led you to identify risk and protective factors for caries in the study population. The result section had not addressed the primary study objective - rank the risk factors for dental caries among these first-year university students in the first half of 2015. The method section did not identify how you plan to achieve the ranking neither did the results section answer this question.
In the “Methods” section, we have added the following:

Page 7 - Line 183:

“The forward stepwise likelihood ratio method was used for analyses.”

In the “Results” section, we have added the following:

Page 8 - Line 204-211:

“A regression analyses model was designed with the possible explanatory factors from the socioeconomic data (father’s profession, mother’s profession, and part-time job), dietary habits (at least 3 main meals per day, no daily soft drink consumption, water consumption when thirsty, daily candy consumption, and daily sugar-free chewing gum consumption), oral hygiene habits (use of an electric toothbrush and flossing), addictive behaviors (daily smoking and drug consumption), oral health-related behaviors (reason for last dental consultation, self-reported oral health, and failure to seek dental care due to financial reasons) and clinical data (presence of dental crowding, periodontal disease (even mild), sealant remnants, presence of restorative care, and poor oral hygiene revealed by presence of dental plaque and/or calculus).”

Discussion

QUESTION

Please do not repeat data in the result section. A summary of the results without the data is appropriate as the first paragraph of the discussion section. And please the summary should focus on study findings that address the study objective(s). The DMFT score is not a study objective. Please edit the first 3 paragraphs of the result section in line with this suggest. A single summary paragraph is adequate.

•Secondly, this discussion section has shifted the entire focus of the paper away from its main objective – ranking the risk factors (not the protective factors) for dental caries among these first-year university students in the first half of 2015. I would assume that the authors organize their discussion section in this order:

  o Ranking of the risk factors for dental caries

  o Discuss the findings

  o Highlight the strength of the study if any

  o Highlight the study limitation including the limitation with analysis of secondary data and how it relates to this
Conclusion

ANSWER

The “Discussion” chapter was modified according to your indications.

Page 9 – Lines 220-311

Overall comments

QUESTION

The authors need to conduct an editorial review of the manuscript. The English is currently poorly written. Please refer to the BMC Editorial assistance for support and help.

ANSWER

We referred to the language editing services recommended by BMC Oral Health: Nature Research Editing Service. Please find the enclosed certificate (ref D723-85A7-DB83-F37E-83AP).

QUESTION

Also, please change the reference on oral status to oral health status where appropriate. However, I want to assume that what was done was assess the caries, oral hygiene and gingival health status and crowding rather than oral health status. If this is so, it is advisable that the authors be specific and not gloss over terminologies.

ANSWER

The “Abstract” section was modified to be more specific, and the expression “oral health status” was removed throughout the manuscript.

“…oral health issues (dental crowding, Silness-Løe plaque index, calculus index, community periodontal index of treatment needs CPITN, presence of pit and fissure sealant remnants, presence of restorative care, and DMFT index).”

We thank you once again for your constructive remarks.