Peer Review Report

Review Report on Methodological approaches to comparative trend analyses: the case of adolescent toothbrushing

Original Article, Int J Public Health

EVALUATION

Q 1 — Please summarize the main findings of the study.

This submission presents and compares three statistical approaches to study temporal trends in health type of settings.
The pro and cons of each approach are discussed and illustrated on real data from the Health Behaviour in School-aged
Children Study (HBSC). It can be considered as a tutorial for practitioners of the field.

Q 2 — Please highlight the limitations and strengths.

My global assessment is rather positive, but I think that the manuscript needs to undergo a major revision before being ready for publication. Below, I offer my detailed major and minor comments.

Q 3 — Please provide your detailed review report to the authors. The editors prefer to receive your review structured in major and minor comments. Please consider in your review the methods (statistical methods valid and correctly applied (e.g. sample size, choice of test), is the study replicable based on the method description?), results, data interpretation and references. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.

MAJOR COMMENTS
1. It is a pity that the paper is so much focused on tooth-brushing type of data. Maybe that the scope can be enlarged a bit (the authors mention bullying type of data as an example as well). The broader scope could be reflected on the title, on the text and on the examples.
2. In the discussion of the models, one step of the good practice in statistical analysis is missing: model validation. One would for instance look at the residuals, that is the quantile (also called Dunn-Smith) residuals, if logistic regressionis used (see also point 4b below).
3. Methods – Data:
a. It would be nice to see some more exploratory data analysis of the data (plots of trends of each country?). See
also 3c.
b. Also, can you give precise instruction in the manuscript on how to download the data? How do one get the files
HBSC2022_TREND(18.04.2024).* ?
c. Table 1 gives a very aggregated view (all years). It would helpful to have the information by wave.
4. Modeling of Trends: Even though I find this section globally good, I think it can be improved further.
a. The original outcome is measured on a 4 classes categorical variable, which is then converted into a binary outcome, which seems to be appropriately modeled with logistic regression. Therefore, it would be good to replace "simple regression" with "simple logistic regression" for precision throughout the text.
b. the stratified approach: It is said that the model "failed to identify the non-linear changes". I agree. There is a simple fix one could try, is to add a quadratic effect for time. Or, take a non-parametric regression standpoint.

c. Figure 1: To better reflect the characteristic of the model, the point estimates (at year 2006,2010,2014,2018,2022) should not be connected with lines. The same comment is valid for the plot corresponding to the separate analysis in Figure 2.

d. I understand that the output will be long, but I think Table 3 should give all the estimates, including the main

and interactions country effects. This would support the claim about Sweden and Finland on l. 184-187). Also, it will be helpful to discuss how to interpret intermediate cases where only part of the interactions terms are significant.

5. There is quite a confusion in this section (Illustration and consideration) with reference to the panels of Figure 2.

a. I suspect that the middle panel and the right panel have been switched? But even so, the comments in the text are not consistent with what is shown in Figure 2 (l. 230 "some slopes appear more steep than others": really?, negative trends with the fixed effects approach?).

b. Figure 2 could be improved by color-identifying (some of) the countries in the three panels to see how their fits compare. Also, replace "multilevel model" with the same terminology as in the text.

MINOR COMMENTS

A. There is some confusion throughout the text about the year considered on the analyses. For instance, it is said
– abstract: "five consecutive cycles (2002-2022)".
– l. 64: "from 1986 to 2022"
– l. 218: "from 2002-2010" (but Figure 2 shows 2006-2022)
B. The number of countries is also confusing: 42 (abstract) or 32 (l. 218)?
C. replace "interactive effects" by "interaction effects" (l. 170, l. 172)
D. With respect to year, the terminology "nominal" has to be preferred over "discrete", which is used to refer to numerical measurements.
E. l. 245 replace "differed" with "different"
F. l. 246 and ff: unclear to me what the references "logit toothbrushing c.cycle##i.countryno" etc

PLEASE COMMENT

Q 4   **Is the title appropriate, concise, attractive?**

As mentioned in point 1. of the major comments, maybe that the title can be made less focused

Q 5   **Are the keywords appropriate?**

yes

Q 6   **Is the English language of sufficient quality?**

yes

Q 7   **Is the quality of the figures and tables satisfactory?**

No.

Q 8   **Does the reference list cover the relevant literature adequately and in an unbiased manner?)**

yes

QUALITY ASSESSMENT

Q 9 Originality

Q 10 Rigor

Q 11 Significance to the field

Q 12 Interest to a general audience

Q 13 Quality of the writing

Q 14 Overall scientific quality of the study

REVISION LEVEL

Q 15 Please make a recommendation based on your comments:

Major revisions.