Reviewer’s report

Title: Saliva cortisol in relation to aircraft noise exposure: pooled-analysis results from seven European countries

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Reviewer: Gunn Marit Aasvang

Reviewer's report:

This study examines the association between exposure to aircraft noise and various measures of saliva cortisol. The proposed hypothesis is that exposure to noise induces stress, and that the corresponding physiological responses, such as increased HPA activity, can be reflected in the level of saliva cortisol. In general, the paper is a well written and the methods and results are clearly presented. The size of the study is clearly a strength since previous studies of noise and potential biomarkers are scarce, seldom population based, and often limited in size. The HYDE study is a pooling of data from the previous HYENA and DEBATS study, yielding 1300 participants living near airports spread over Europe. Before the paper merits publication some more information could be added for the understanding and interpretation of the findings.

1. What are the hypothesis regarding exposure to noise and morning versus evening cortisol? Do you look upon the cortisol responses as short-term responses or long-term responses/adaptations to noise? Please elaborate on this! Furthermore, if the night-time noise exposure is the most stressful; would it be reasonable to observe the effect on morning saliva, the evening saliva or variations in levels. I miss a more thorough discussion on this.

2. You have used the term hormonal disruption. Is this appropriate for small changes in secretion of cortisol? Please consider!

3. Please indicate the correlation between the noise indicators; no need for a total matrix, but the range in correlation between them. They are often highly correlated and this should be commented upon since this impact on the interpretation of the results for the various noise indicators.

4. On page 6, line 49 it is stated that data were collected from 4,861 persons. Could you please inform how many were contacted and the response rate?

5. Page, 7, line 50. Could you please give the values of the lowest and highest levels of exposure to aircraft noise, from which the participants were recruited?

6. As far as I can understand, it is taken only two measures of saliva cortisol; one in the morning and one in the evening for each participants. Could you please give some more information on how you did the calculations to arrive at the average variation in cortisol
per hour and the relative variation per hour? Did you in some way create a diurnal cortisol profile for each participant.

7. Page 9: Exposure assessment. Please give some information on the input data to the noise model (e.g. emission data, traffic intensity, diurnal distribution etc).

8. Page 10. Noise sensitivity: Line 133-35. In DEBATS study a 5-item scale was used to measure noise sensitivity, but only three are mentioned (less as, as sensitive, or more sensitive compared to other people). In the next sentence the harmonization to the HYENA five items were reported. For less confusion, this should be rewritten.

9. Income was not included as a possible confounder. Please discuss.

10. I miss a discussion on the strength and weaknesses of using saliva cortisol as a biomarker of noise induced stress; especially which other factors (than gender, and menopause) that may moderate the associations.

11. Please include "statistically" before significant when results of statistical analyses are reported. Findings can be significant also in other ways (e.g. clinically significant).

12. Page 13, line 217, …, and both all the noise indicators …Language, please reformulate.

13. Please indicate how many women in each group (under or above 50 yrs of age). Include this also in Table S2.

14. Page 15, line 256: Moreover, the main findings of this study was the significant associations between noise levels and annoyance and the average relative-variation per hour. These results is not described in the result section. Please give some more information on this.

15. Page 17, line 297. You state that sleep duration could be regarded as a confounder. It could however also be a mediator since night-time noise can impact on sleep latency and induce early morning awakenings. Please discuss.

16. Table 1. LAeq,24 h in table heading, but results for Lden in the table. Please correct. Please also indicate what is reported for Alcohol: is it percentage in each (units/week) group? The same relates to Smoking habits.

17. Table 3. The estimates for male were not so different from that of females, especially for the relative variation per hour. This should be commented upon, not only focusing on the statistical significance, having in mind that the men sample was smaller than the female study sample.

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