

Author's response to reviews

Title: Road traffic noise and hypertension: results from a cross-sectional public health survey in southern Sweden

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Author's response to reviews: see over

Revisions

We would like to thank you for taking time to scrutinise and comment on this paper. We truly appreciate your effort and it has been both interesting and challenging to follow up your suggestions.

Below we have pasted your comments starting with editor and subsequently referee number one, two and three. After each paragraph we have written our reply in bold italic style.

Sincerely
The authors

Editor

- On the title page, please remove "original article" in the upper left corner. After the affiliations, insert the phrase "Email addresses" and list the authors' email addresses in sentence format separating the pairs with semi-colons. Please remove the address for corresponding authors heading and information. Insert the phrase "Corresponding author" with a symbol after it like an asterisk and place that symbol after the authors affiliation superscript. Additionally the running title, word count, financial support, potential ties and acknowledgment should be removed. The financial support acknowledgments should be placed at the end of the manuscript. Please see Instructions for Authors for more details.
- Please remove the page numbers.
- The headings should be unbolded, also remove the italics from the body of the text.
- The references throughout the manuscript should be displayed as [#] and not as superscripts.
- Please place commas after the thousands position of the numbers e.g. p. 5 46,200 and 2,800.
- On page 5, in the first paragraph, in the sixth sentence, change reminding to reminder.
- On page 9 in the first paragraph, the number 3 should be spelled out. (Numbers under 10 as a rule are written out.) Same in the middle of p. 12.
- On page 10, there is an extra return carriage between before the Discussion section. Please remove.
- P. 11, a hyphen is needed in the second paragraph, second sentence between two and thirds.
- Please insert a section called Conclusions at the end of the main text.
- Please add a List of Abbreviations and Competing Interests section before the Authors' contributions section.
- Please move the reference to the following page and see the Instructions for Authors for the proper formatting of this section.
- The tables should be in closed cell format with all the borders visible.
- In the figures, the wording figure 1, figure 2 and figure 3 overlap with its respective figure. Please place the wording so that it does not obscure the each figure.

We have edited the manuscript according to your instructions, except in the case of email addresses where we used the template available online, since we weren't sure exactly how you meant.

Referee 1

Specific remarks

1) Page 5, 2nd paragraph

Response data and Figure 1 should move to the Results section

Response data and figure is now in the first paragraph of the result section

2) Page 7, end of 2nd paragraph

Add a sentence saying that the noise exposure refers to the most exposed façade (which is not necessarily the side of the house where people have their living or bedroom; implication: underestimation of effect estimates)

A sentence has been added in the suggested place

3) Page 7, last paragraph

Describe the annoyance scale (4 categories) and explain why the internationally standardized ICBEN scale for the assessment of noise annoyance was not used (which was available when the study was carried out).

Move the results and Figure 2 to the Results section

Changes have been done according to suggestions. Regarding why we did not use the standardized question we chose to use a question comparable to the national Swedish survey (Miljöhälsoenkäten 1999) which used a question similar to ours.

4) Page 8, second half

Disturbed sleep was considered in the statistical analyses. However, it was not mentioned in the Methods section. The wording of the questions should be given on page 7 where the annoyance question is given.

This question and the question regarding strained economy has been clarified in detail in the last paragraph of Method - statistical analysis.

5) Page 9, end of 1st paragraph

The results (odds ratios) should be shown in the text (not only in Tables).

OR(95% CI) has been added in text for the high exposure levels

6) Page 9, 2nd paragraph

Add "significant" to "A finer stratification of age indicated that significant exposure effects..."

Word added.

7) Page 9, end of 2nd paragraph

Again, please show results (odds ratios) in the text.

Action: OR(95% CI) has been added in text for the high exposure levels. We also added OR in two other similar places in the same paragraph discussing other age groups.

8) Page 10, 2nd paragraph

I do not quite understand in which respect the additional analyses differ from the original analyses (Table 2). Both models adjusted for the same covariates.

Please explain the difference more precisely.

The additional analysis included everyone with intact information on age, sex and BMI. We want to show that the exclusion of the ~1800 persons due to missing information on alcohol, socio-economy, education, exercise and smoking did not change our results. OR 1.51 when including all compared to 1.52 when only using our study population. We have done our best to clarify this in both text and as additional information and footnotes in tables 2 and 3

9) Page 11, first paragraph

The authors are too critical regarding their response rate (57%). It may be low for Sweden, but is within the upper range of what can be achieved in Europe in random population samples, nowadays.

We have omitted the word "low" and added a sentence stating that the proportion of non-responders was quite substantial.

10) Page 11, end of page

The remark regarding bias towards the null is true for the odds ratio (which was calculated). The risk ratio, however, would not be affected.

This is true only if the specificity is 100%. However, when sensitivity and specificity are lower, which we assume in this case, RR and OR will both be biased towards the null.

11) Page 12, second half

"%" is missing: "...and 8% at 40-44 dB(A) ..."

Corrected

12) Page 13, second half

"to" is missing: "...relative to other risk factors..."

Corrected

13) Table 1

Noise level 0 dB seems to be unrealistic due to background noise. I would suggest a cut-level.

We have changed 0 to 15dB which is our lowest estimated exposure.

Referee 2

Major Compulsory Revisions

A major weakness which the authors´ also refer to is the assessments of traffic noise. A very simplified version of the Nordic prediction model was used. According to recent data it might be a rather great discrepancy between the results comparing the full Nordic prediction model with a simplified one. As validation prevalence of annoyance is used in this study which is a good substitute. In that respect I recommend to refer to a study just published; Validering av miljöhälsöindikatorer för buller [in Swedish] Socialstyrelsen 2009-126-159. Another possible way to improve your noise assessments is to validate against assessments attained by the full Nordic prediction model. If you have participants from e.g. Malmö there these assessments are available you could make a comparison for 30-50 subjects. This could improve your noise assessments very much.

We have included a part in the discussion where we refer to an ongoing study on comparison between the model we have used in this study and a more elaborated one for the Malmö population. The median difference, quartiles and 2,5-97,5 percentiles (from preliminary analysis) have also been added (n=2,966). There seems to be a slight overestimation in the simplified model (+1 dB) but the precision is not good. For the categorised analysis this does not impose a large problem, however, it is a bit worse for continuous analysis. It must be kept in mind though, that the other model isn't "the truth" either.

Minor Essential Revisions :

In table 1 I think it is too many subgroups for socioeconomic status. It would be enough to use 3 or 4 subgroups for this categorizing.

We want to present the same figures in the table as we used in the analysis. On one hand side it might be easier for the reader with fewer groups. On the other hand side we have tried several times to merge the groups before, and as an example the difference between "white collar workers" and "blue collar workers" is smaller than within the group "white collar workers". Merging the other groups also impose some problems since they are very heterogenic. Since we have a large population and no "power-problem" we would like to stick to the fine stratification.

Discretionary Revisions

I miss some recently published articles of major interest. It would be of interest to add some information about these studies.

Babisch (2008); Road traffic noise and cardiovascular risk. *Noise&Health* 10, 27-33.

Belojević G., et al. (2008). Nighttime road-traffic noise and arterial hypertension in an urban population. *Hypertens Res* 31(4), 775-781.

Järup et al (2008). Hypertension and exposure to noise near airports: the HYENA study. *Environmental Health Perspectives*, 116, 329-333.

Thank you for making us aware of these papers. Babisch and Belojevic are now added to the background section.

Regarding the statistical analysis I wonder if you can clarify, why you used logistic regression as the prevalence of cases is rather high.

OR is valid regardless of prevalence, however, it is true that it cannot be interpreted as prevalence ratios when prevalence is high. Most other published papers on this topic have used this method. Hence, the reason for us doing so is allowing easily comparable results.

Work noise is considered to be an important risk factor at least for acute increase of blood pressure. You had one question about work noise and I miss information about how it was formulated.

The question has been spelled out in the discussion.

Referee 3

Reviewer's report:

Discretionary Revisions

The major weaknesses of the study are well documented, but in my taste the discussion should be more compact and focused/sharp, what are the major issues? Here we do get easily lost in detail at the risk of not conveying the major messages of this paper.

We agree that the discussion needs to be clearer. Additional to some changes made as a consequence of your comments we have added subheadings following the JECH-model which we hope will make it easier to read.

1. Some loose end remarks in the discussion should either be removed or described in more detailed/rewritten

e.g: page 13 line 16-20: The possible explanation by noise sensitivity is a weak one esp. since the authors do not refer to NS findings re. age groups etc but refer to annoyance issues..... Annoyance and NS were not included in the survey/analysis so these remarks do not add much unless there are some referrals to relevant papers showing some evidence in this direction. Idem for Earlier onset of disease: either add info or drop....

We have mixed up the semantics. Sensitivity referred to annoyance, which is incorrect and has now been changed to annoyance. Further we have referred to Babisch 2001 for hypothesis on causal explanation between annoyance and hypertension and also added Fyhri 2009 who questions this causal model. Sensitivity and/or annoyance eventual role in causing hypertension is not within the scope of this study and we have therefore chosen not to take the discussion further than that.

2. Same page above: relation between PM10 and Hypertension Arguments are not strong!!!

There is def. more evidence than stated that fine particles are associated with CVD and resp disease . Indeed the combined effect of Noise and Airpollution has to be studied in more detail but ref. to Hyena study (Jarup) Davies, Hoek et al etc might be appropriate.

Recent papers also indicate increased mortality among the elderly due to # Fine particles. < There is growing evidence that even small increases in fine particle air pollution (traffic and power plant related) increases the risk of cardiovascular and respiratory disease among people > 65 years of age (Dominici et al., 2006).

Yes, there is convincing evidence for CVD and respiratory disease, but we have still not found any epidemiological studies looking at the relation particles - hypertension. We have however added a reference to a recent review on PM and CVD. (Cheng H, Goldberg MS 2008)

3. I am not clear why the last two paragraphs were included since the role of noise annoyance was not included in the regression models..... also different aspects are discussed and it is not clear what the message is: the paragraph starts with annoyance measures (previous analysis) and then moves via sleep disturbance back to the direct association between noise and Hypertension:

4. Next: again annoyance as introducing sentence, while in rest of text annoyance only used as a control var rather than outcome or mediating factor.....

In these two paragraphs there indeed seems to be a misbalance /mismatch with rest of paper and focus and outcomes.

We agree. This part is unfocused and a bit off topic. We have removed the parts referring to annoyance.

5. In contrast: The last two sentences re: age specific analysis and the need for “objective” and historical data seem much more relevant and should be argued based on findings more strongly.

We hope that the changes made and restructuring will clarify our discussion on the above mentioned topics.

In summary, good well written well documented paper, but the discussion should be rewritten: more refs to relevant papers, drop unfocussed parts esp re. role of annoyance etc, expand the future direction part re measurement of hypertension, the need for historical exposure data and age specific analysis.