

Peer Review Report

Review Report on Effects of fine particulate matter on cardiovascular disease morbidity: A study on seven metropolitan cities in South Korea

Original Article, Int J Public Health

Reviewer: Alexandra Schneider

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EVALUATION

Q 1 Please summarize the main findings of the study.

However, I have some minor, but also a few major comments.

Methods:

1. Lines 92–97: Could the exclusion of about 1/4 of the data lead to a selection bias as maybe the missingness of the individual data is not at random? Maybe the authors could try a propensity score approach for the participation in the study with full data.
2. Lines 114–116: Please describe in more detail how the data was matched when people had moved. Was it e.g. weighted by the time spent at the specific addresses per year?
3. Line 133: I am not sure that air temperature is needed in this case as this is a study on long-term effects of air pollution and there I don't think that air temperature is really a confounder of the association. Maybe the authors could at least try a sensitivity analysis without air temperature.
4. Sentence in lines 181–181 is grammatically not correct, please revise!
5. Line 190: Please drop "the" in front of "average".
6. Figure S1 and line 77: Why were only CVD events from 2018 used and not also events between 2015 and 2017? Why do the authors exclude all incident events of 2015–2017 while they consider the exposure in these years and could easily consider the time of each individual to the event (or the censoring)?
7. In other similar studies, the authors often use age as the underlying time-variable instead of just adjusting for age. It might not make a big difference, but maybe the authors could try a sensitivity analysis.

Results:

1. Table 2: Please put the explanation for the different periods (1–4) also in the footnote of the table.
2. Figure 1: In the introduction you wrote that the level when the alert becomes active changed over time (before vs. after 2018), so I am not sure one can compare these two different periods then easily as with the changed level certainly the number of alerts changed. Please at least indicate in the figure when the alert level was changed.
3. Tables S1/S2: Are the cities equal to the regions, is this used as a synonym? So this analysis then only includes city population? I may have overlooked it, but this did not become clear to me when reading the description of the study population.

Discussion:

1. There is usually a small paragraph summarizing in brief the most important results of the study, and I think something like this is missing here. Overall, I suggest restructuring the discussion a bit as I think it is not ideal to have the discussion on the effect modification results right at the very beginning and compare them to existing literature. I think, this should only come after the discussion of the main results for the overall study population. Also the strengths and limitations should be a clear paragraph at the end of the discussion, before the conclusion (which is currently to my understanding in lines 245–251 under "meanings of the study" (which is a slightly unusual term).
2. Please tone down a bit your hypothesis (lines 248–251) about the FH55 findings as it is only a hypothesis or a speculation (although quite plausible), I would say. I suggest declaring it as your hypothesis to explain your findings.
3. Somehow, I think that the first point under limitations is actually a novelty of this study and could also be mentioned as an advantage of the study.

Q 2 Please highlight the limitations and strengths.

Strengths: Very large sample size, clearly defined outcomes (ICD-codes), well conducted study, statistical methods valid and correctly applied, plausible conclusions

Limitations: Exclusion of about 1/4 of the original sample size due to missing data and therefore quite a potential for selection bias, Outcome of incident CVD only from the year 2018 and unclear why the authors made this choice.

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.

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Q 4 Is the title appropriate, concise, attractive?

Yes, I think that title fits well to the described study and analysis.

Q 5 Are the keywords appropriate?

Yes, the keywords are appropriately chosen.

Q 6 Is the English language of sufficient quality?

Yes, except for a few sentences which seemed not fully correct to me, the manuscript was well-written.

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

Yes.

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

Yes, I think they covered the relevant literature and did not make any pre-selection by county, gender etc.

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.