Author's response to reviews

Title: Perceived exertion, comfort and working technique in professional computer users and associations with the incidence of neck and upper extremity symptoms

Authors:

Agneta Lindegård (agneta.lindegard@vgregion.se)
Jens Wahlström (jens.wahlstrom@vll.se)
Mats Hagberg (mats.hagberg@amm.gu.se)
Rebecka Vilhelmsson (rebecka.vilhelmsson@astraseneca.com)
Allan Toomingas (allan.toomingas@ki.se)
Ewa Wigaeus Tornqvist (ewa.wigaeus-tornqvist@hhj.hj.se)

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Author's response to reviews: see over
Thank you for your comments and the reviewers comments regarding our manuscript

“Perceived exertion, comfort and working technique in professional computer users and associations with the incidence of neck and upper extremity symptoms“

In the revised paper we have tried to meet the raised issues from the reviewers. The paper has been resubmitted electronically as requested. The major changes are that we in line with one of the reviewer’s comments have added a limitation section in the discussion and that we have rephrased the conclusion as recommended by the other reviewer. We have also tried to warrant our point of view towards the other remarks made by the reviewers, and when possible revised the manuscript according to the well-founded remarks.

Response to the comments by reviewer #1:

1. Methods, Data treatment and analysis, paragraph 1, line 4.
How robust are the study’s findings if the definition of a ‘case’ (defined as a participant who reported symptoms lasting three or more days affecting any of these body regions during the preceding month) is varied? Do these associations still hold if a more conservative case definition (e.g. symptoms for 10 days in the preceding month) is applied?

Response: It is a very relevant question and the cut-off for different “case” definitions could always be discussed. However, we consider our case definition to be a fairly “conservative” one compared to similar studies in the same research field. Three days or more with symptoms during the preceding month, clinically could be considered as an early stage of the disease/disorder but still many of these “cases” will develop into more manifest conditions (empirically and clinically obtained information). Moreover, this definition have been used in other studies published from the same cohort ( Wahlström J et al Occup Environ Med. 2004 Jun;61(6):523-8 and Wigaeus Tornqvist E et al Int Arch Occup Environ Health. 2009 May;82(6):689-702). In the revised manuscript this issue has been discussed in the discussion part and the above mentioned references have been added.

2 Conclusion, paragraph 1, line 3.
The authors have shown an association between perceived exertion and risk of the development of neck, shoulder, and arm/hand symptoms. However, the authors then suggest that “screening for exertion and comfort during computer work could be used as a cost effective and efficient tool for early detection of incipient neck and upper extremity symptoms.’ This might be so but they do not present any economic analysis to support the cost-effectiveness of such screening nor is the sensitivity and specificity of this instrument discussed. This concluding sentence should be revised or the data which supports these statements presented.
Response: In concordance with the remark from the reviewer we have in the revised manuscript excluded the section regarding the cost effectiveness of the tool since we do not have data supporting this statement.

Minor essential revisions
3. Supplementary file 1
The table is truncated in the middle of the arm/hand column: this should be revised.

Response: This has been taken care of in the revised manuscript.

4. Methods, paragraph 2 line 1
Please indicate how many ergonomists were involved in data collection.

Response: This information is now added in the revised version of the manuscript.

5. Results Follow-up paragraph 1 line 8
How many participants dropped out early?

Response: In total there were 167 subjects with a follow-up time less than three months. Of these 167, 141 (84%) were incident cases of neck/shoulder pain and the remaining 26 (14%) were drop-outs. We have also added this to the results “The median follow up time was 10.3 months (interquartile range 4.1–11.2 months)”, which makes it clear that 75% contributed with at least 4 months of person-time.

6. Results paragraph 1 line 2
The high incidence of cases observed merits further consideration in the discussion.

Response: A part discussing the relatively high incidence has been added in the discussion part of the revised manuscript.

Discretionary revisions
1. Methods, Study population, paragraph 1, line 6
The authors have relied on self-reports of computer use –although widely used how reliable is this metric? The merits of self-report versus computer logged usage might be briefly considered in the discussion.

Response: A part about self-reports versus more direct measurements has been added in the new section called “Strengths and limitations”.

Minor issues - not for publication
Background paragraph 1, line 11 ‘factors related the work place or work organizational’ please rephrase – ‘factors related to the work place or work organization’ might read better.

Response: This has been changed in the revised paper.
Methods, Data treatment and analysis paragraph 1, line 9
Extra full stop should be deleted.

Response: It is now deleted.

Methods, Data treatment and analysis, paragraph 4 lines 2 and 4.
It is unclear why a is shown in bold in these lines.

Response: It was a pure mistake and it has been corrected.

Results, paragraph 1 line 6’
the risk of experiencing symptoms in any of the other regions under investigation was also was also higher (Table 1).’ – ‘was also’ is repeated

Response: It has now been corrected

Discussion, Perceived exertion and comfort, paragraph 1, line 14
‘seen’ is in bold

Response: This has been corrected.

Discussion,
Perceived exertion and comfort, paragraph 1, line 20 ‘As’ is in bold but it is not clear why.

Response: This has been corrected.

Discussion,
Working technique, paragraph 2 line 1 and 2 and 7‘One’ and ‘was’ and a are in bold.

Response: These errors have been corrected in the revised manuscript.

Response to the comments by reviewer #2:

Major comments:
Background
1) Please provide more connections between the information introduced in the “background” and the three hypotheses. For example, although there is a good description of some proposed causes of symptoms such as working technique, working posture, and perceived muscle tension, it is unclear why “perceived exertion”, “comfort”, and “working technique” were chosen to be researched in this study, and why the authors expect these factors to be associated with symptoms.
Response: A short explanation and relevant references justifying the choice of outcome variables have been added in the background section.

Methods
Study Population
2) Please provide more details on your study population. For example:
   a) What types of work places did you recruit participants from?

Response: Examples of the different types of work places included have been added in the revised manuscript.

b) How did you recruit participants?

Response: More information about recruitment procedure has been added.

c) How many people were approached for recruitment, and how many of these filled out the initial surveys?

Response: This information has now been added.

d) What types of jobs did the participants perform? As written, it is unclear how the participants could be considered “professional computer users” but only work at a computer for a self-reported less than 4 hours per day. Please describe what else the participants do for the duration of their work days.

Response: A section addressing this issue has been added in the revised manuscript.

e) Do any participants experience high physical exposures?

Response: Apart from computer work all participants were exposed to ordinary physical loads connected to office work in general as described in the revised version of the paper. These office work tasks are according to the scientific literature usually characterized as a “low load” work when it comes to physical load. There is in our opinion no reason to believe that the selected study population would differ in a substantial way from that assumption however, we do not have exact information regarding every single participant. Moreover, in the question regarding perceived exertion we explicitly ask for exertion in connection to computer work for all investigated body regions.

f) Was there any loss-to-follow-up during the 10-month follow-up?

Response: We have clarified this now. First sentence in the results now reads “The median follow up time was 10.3 months (interquartile range 4.1–11.2 months)”, which makes it clear that 75% contributed with at least 4 months of person-time.

Follow-up
3) The last sentence of this paragraph is unclear.

Response: It has now been clarified.
Ratings of perceived exertion and comfort
4) Were these ratings measured only one time, during the baseline questionnaire?

Response: Yes, we only measured it once in the baseline questionnaire. It has been clarified in the revised manuscript.

5) How stable are these scores over time?

Response: It is likely to assume that these scores may vary over time but in spite of this “lack” of reliability, the results show a strong association, which means that we may have underestimated the real risk since these kind of random “misclassification” always leads to a risk ratio approaching 1 (no risk).

Response:

Data treatment and analysis
6) Once participants first reported a symptom, were they then considered a case for the rest of the follow-up?

Response: This has been clarified in the revised manuscript.

Are participants considered cases separately for the three upper extremity regions (for instance, can be a case for neck but not for shoulder)?

Response: A case was defined as a participant classified as non-symptomatic at baseline in the three defined region and who later during follow up reported symptoms from any of this regions. If being a neck case for the first time this participant still contributed with person-time regarding shoulder and arm/hand symptoms. Only first time cases for each body regions were considered. This has now been rewritten in the revised version of the paper.

Results
7) Please clarify the result that “the risk of experiencing symptoms in any of the other regions under investigation was also higher” described in the “results” section. From table 1, it does not appear that the authors looked at whether perceived exertion in one region affects symptoms in another region.

Response: We chose to exclude these results from the table since we thought that for instants the association between exertion in the neck and symptoms from the hand/fingers would be of minor interest, however we do think that these associations merits to be mentioned in the text section of the results. New information about this has been added in the revised manuscript.

Discussion
8) The authors mention that in this study there was no clear relationship between comfort and symptoms in shoulder or arm regions, while a relationship was found in other studies. Please speak to whether the authors have any ideas why this was the case.
Response: A section dealing with this “problem” as been added in the discussion part of the paper.

9) Please include a “limitations” section in the discussion.

Response: A section called “Strengths and limitations” has been added in the discussion part as requested.

Figures
10) Please explain the numbers in Table 1. It is unclear what is indicated by the values for “events” and “censored”.

Response: We have now changed the table text to read “cases/non-cases” instead.

Minor Comments
11) Please change the following sentence in the “background”, to: “Both cross sectional and longitudinal studies have suggested, however, that factors related to the individual (age and gender), working technique, working posture, muscular rest and perceived muscle tension as well as factors related to the work place or work organization…”

Response: This has been changed accordingly.

12) Please remove the extra period at the end of the first paragraph on page 8.

Response: It has been removed in the revised manuscript.

13) Please incorporate more information into the figure captions.
Response: More information has been added in the figure text.