PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Psychosocial work demands and physical workload decrease with aging in blue and white-collar workers: A prospective study based on the SLOSH cohort
AUTHORS	Åkerstedt, Torbjörn; Discacciati, Andrea; Häbel, Henrike; Westerlund, Hugo

VERSION 1 - REVIEW

REVIEWER	Pieter Coenen Dept of Public and Occupational Health Amsterdam UMC, location VUMC Amsterdam, the Netherlands
REVIEW RETURNED	08-May-2019

| GENERAL COMMENTS | The authors present a study in which they have assessed trajectories of physical and psychological work demands as well as fatigue and sleep problems over time. This is a highly relevant topic which certainly deserves the attention of BJM Open readers. However, there are a couple issues which I think need to be addresses before this manuscript can be published.

My first general comment is around the conclusions drawn by the authors. In the discussion section the authors give a quite nuanced interpretation of their findings were they address the very important and real explanations for and limitation of their study. However, in the abstract, 'what this paper adds' and conclusion section this nuance gets lost. Although I understand that authors are bound to word limits, I think some of the limitations should be acknowledge in these sections and at least the conclusions should be tuned down.

Another general comments is that I find the results section hard to follow. An important reason for this is that I have difficulties trying to interpret the effect sizes in the various tables, where the authors seem to be focussed too much on p-values. The authors ought to take the reader by the hand a bit more and explaining what was done, which effect sizes were found and what these effects mean. Related to this is that I cannot fully grasp the finding in table 2 with a positive slope of the association of sleep problems and work demands. In my book these findings would suggest that an increase in work demands are association with an increase in sleep problems. However, that does not seem to be in correspondence with what can be seen in figure 1. Please take the |
|---|---|

reader by the hand a bit more (as mentioned above) to make these and the other results clearer.

Slightly related to the previous comment is that I currently lack a feeling of how big of an issue the results may be. How big are the increases/decreases in outcomes in terms of (clinical) relevance? I think that adding more details on that in the beginning of the discussion section, , would be of much help to the reader.

Specific comments
Abstract – line 22. The number of 5000 participants is different from the one mentioned in the manuscript. Please clarify.

In the abstract some important information is lacking: what was the sample like (age, occupational groups, etc.)? How were the various variables measured (by self-report)? And what do results like 'decreased markedly' mean? I think providing effect sizes would be of much use to the reader here.

Page 4, line 17. Please remove the 'if' in this sentence.

The second paragraph on page 5 'considering the demographic…' is a bit hard to understand. Can the authors elaborate on this a bit more.

Throughout the manuscript, starting in the 'what this paper adds' section (line 20), what is meant by 'high white collar'?

Page 6, line 3. Consider to add 'psychosocial' between 'with' and 'work'.

Page 7, line 19. '18% were not working'. How were these participants treated in the analysis?

Page 7, line 36. Remove the 'd' from 'widhe'

Page 10, line 3. Please remove the 'at' from this sentence

The effect size presented on page 11, line 6 does not seem to be correct.

What do the authors mean by '…is a new finding' (page 15, line 34)?

Page 16, line 46. The sentence 'These lines … are needed' is hard to understand. Please rephrase.

On the top of page 19 the authors mention that all their outcomes are by definition based on self-reports. I do not agree with that. There are excellent ways to measure physical work demands or sleep quality in an objective way.

Finally, the authors could consider to discuss the issue of productivity. If indeed their hypothesis is right that the findings of this study can be explained by that more experience reduces work demands, that would suggest that productivity would remain stable over time or would even increase. It would therefore be very interesting for future research to see comparable study data for productivity outcomes.

REVIEWER	María del Carmen Pérez Fuentes
	University of Almería (Spain)
REVIEW RETURNED	21-May-2019

GENERAL COMMENTS	The work is current and presents an important topic, but it has some limitations that must be corrected:
	The introduction should be improved and include work hypotheses. In addition, we propose that in the introduction establish the theoretical bases of the possible models of analysis of the studied variables, that is, to indicate the model of relationship between the variables.
	We believe that the work analyzes in a longitudinal way the aspects related to the permanence in the work, but analyzes the influence of the variables in that dependent variable. We believe that it is an important aspect and should be studied, not only by incorporating regression models into the analysis, but also mediation models of the variables that may be mediating according to the existing theoretical base.
	This is a fundamental aspect for the acceptance of the work, not only to see over time the changes in the variables studied of the participants, but also the influence on the variability of the dependent variable of each of them.
	In the same way, they must clearly differentiate between the discussion section and the conclusion section. It is not differentiated. In addition, there are occasions in the discussion that repeat the results, they should improve the writing.
	I worry about something that does not appear in the work, and it is the way of selecting the sample, and the degree of representativeness of it. In addition, in a longitudinal study there is usually an aspect that is known as sample mortality. I ask the authors about this and I think it must be incorporated or pointed out.

VERSION 1 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 1

Reviewer Name: Pieter Coenen

Institution and Country: Dept of Public and Occupational Health

Amsterdam UMC, location VUMC

Amsterdam, the Netherlands

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

The authors present a study in which they have assessed trajectories of physical and psychological work demands as well as fatigue and sleep problems over time. This is a highly relevant topic which certainly deserves the attention of BJM Open readers. However, there are a couple issues which I think need to be addresses before this manuscript can be published.

1.My first general comment is around the conclusions drawn by the authors. In the discussion section the authors give a quite nuanced interpretation of their findings were they address the very important and real explanations for and limitation of their study. However, in the abstract, 'what this paper adds' and conclusion section this nuance gets lost. Although I understand that authors are bound to word limits, I think some of the limitations should be acknowledge in these sections and at least the conclusions should be tuned down.

As you indicate, there is not much room for nuances in the abstract and conclusions, but we have tried to downplay the conclusions (the what section has been removed as per instructions of the editor). p2 and 12

2. Another general comments is that I find the results section hard to follow. An important reason for this is that I have difficulties trying to interpret the effect sizes in the various tables, where the authors seem to be focused too much on p-values. The authors ought to take the reader by the hand a bit more and explaining what was done, which effect sizes were found and what these effects mean.

We understand this point have made an effort to interpret the results. As to effect size, there is no consensus on how to compute them in mixed model regression. They are, therefore, often left out. However, there are, a number of possibilities suggested by different statisticians. We have now added effect sizes for all analyses by dividing the coefficient of the slope by the square root of the variance of the residuals, which we consider the most reasonable one (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3743548/#FD8)

We have added the explanation to the methods section. We have also added statements in the text of the results section and included comments in the discussion.

p10, p11-12, p13&15 (table 1 and 3), p17&18

3.Related to this is that I cannot fully grasp the finding in table 2 with a positive slope of the association of sleep problems and work demands. In my book these findings would suggest that an increase in work demands are association with an increase in sleep problems. However, that does not seem to be in correspondence with what can be seen in figure 1. Please take the reader by the hand a bit more (as mentioned above) to make these and the other results clearer.

We understand this point and should have realized that a comment is needed. We have added one to the results section and to the discussion. In brief here, the confusion arises from the fact that the regression/correlations are computed between slopes (and not between absolute values). For a variable with mainly negative individual slopes there may be a positive correlation with the slopes of a variable with mainly positive slopes. Such a positive correlation means that individuals with large negative slopes (which constitutes low values, numerically) on one variable, have a low positive slope (low value) on another variable, while individuals with small negative slopes (a high value) on the first variable also have high positive slopes (a high value) on the second variable. Regarding the positive correlation between demands (negative slope) and sleep problems (positive slope) the interpretation is that individuals with a steep decrease in demands also have a less steep increase in sleep

problems. A reduction in demands thus seems to protect against a strong increase in sleep problems (with age).

p10, p11-12, p13&15 (table 1 and 3), p17&18

4.Slightly related to the previous comment is that I currently lack a feeling of how big of an issue the results may be. How big are the increases/decreases in outcomes in terms of (clinical) relevance? I think that adding more details on that in the beginning of the discussion section, , would be of much help to the reader.

Agree, we have now added text in the results and discussion that should make the relevance of changes across time clearer.

Specific comments

5.Abstract – line 22. The number of 5000 participants is different from the one mentioned in the manuscript. Please clarify.

Sloppy approximation, now corrected.

6.In the abstract some important information is lacking: what was the sample like (age, occupational groups, etc.)? How were the various variables measured (by self-report)? And what do results like 'decreased markedly' mean? I think providing effect sizes would be of much use to the reader here.

We have now up-dated the abstract accordingly. P2

7.Page 4, line 17. Please remove the 'if' in this sentence.

This section was dropped by the editor.

8.The second paragraph on page 5 'considering the demographic…' is a bit hard to understand. Can the authors elaborate on this a bit more.

We have made a slight modification, that should make the text more understandable.

9.Throughout the manuscript, starting in the 'what this paper adds' section (line 20), what is meant by 'high white collar'?

It was actually explained on page 8, page 5.

10.Page 6, line 3. Consider to add 'psychosocial' between 'with' and 'work'.

Done

11.Page 7, line 19. '18% were not working'. How were these participants treated in the analysis?

Not included in the analyses. This is now added to the text

12.Page 7, line 36. Remove the 'd' from 'widhe'

Done

13.Page 10, line 3. Please remove the 'at' from this sentence

Done

14.The effect size presented on page 11, line 6 does not seem to be correct.

The value is actually correct – it is not a regression coefficient, but represents the difference BCW-HWC at time point T3 (that is the midpoint of the 5 measurement points).

15.What do the authors mean by '…is a new finding' (page 15, line 34)?

We mean that the decrease in work demands across time is a new finding.

16. Page 16, line 46. The sentence 'These lines … are needed' is hard to understand. Please rephrase.

We have added the following: "there is a need for studies on how aging, experience at work, move to other another job, improvement in work tasks, and similar factors lead to a perception of a reduced physical workload".

17. On the top of page 19 the authors mention that all their outcomes are by definition based on self-reports. I do not agree with that. There are excellent ways to measure physical work demands or sleep quality in an objective way.

We agree that physical work demands and sleep can be measured objectively but might not be feasible in a study with >5000 participants. We have now modified the text accordingly.

18.Finally, the authors could consider to discuss the issue of productivity. If indeed their hypothesis is right that the findings of this study can be explained by that more experience reduces work demands, that would suggest that productivity would remain stable over time or would even increase. It would

therefore be very interesting for future research to see comparable study data for productivity outcomes.

Very good point, thank you! We have added a sentence to the paragraph number three the end of the discussion.p22

Reviewer: 2

Reviewer Name: María del Carmen Pérez Fuentes

Institution and Country: University of Almería (Spain)

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

The work is current and presents an important topic, but it has some limitations that must be corrected:

1.The introduction should be improved and include work hypotheses. In addition, we propose that in the introduction establish the theoretical bases of the possible models of analysis of the studied variables, that is, to indicate the model of relationship between the variables.

Agree, we weren't detailed enough. We have now added more theory on the subject matter, including relationship between variables. p4-5

2.We believe that the work analyzes in a longitudinal way the aspects related to the permanence in the work, but analyzes the influence of the variables in that dependent variable. We believe that it is an important aspect and should be studied, not only by incorporating regression models into the analysis, but also mediation models of the variables that may be mediating according to the existing theoretical base.

This is a fundamental aspect for the acceptance of the work, not only to see over time the changes in the variables studied of the participants, but also the influence on the variability of the dependent variable of each of them.

This is a good point in general, and we considered this option, but found that we did not have likely mediators in our material. A key mediation analysis would, for example, look at what it is in the time variable that leads to decreased psychosocial work demands. As we bring up in the discussion candidates are age, experience, stepping down, getting work adapted to capacity, loss of career ambitions, among others. Unfortunately we do not have access to such variables, apart from aging, which is of course identical with time. A similar reasoning goes for physical workload. One could also conceive of mediation between occupational group and psychosocial work demands or physical workload, but also there we lack suitable variables. In the same way, mediation between the change in psychosocial work demands (or physical work demands) and fatigue might be mediated through, for example, perceived or measured effort, but again we lack access to such variables. The arguments would be the same for sleep. We hope this explanation is acceptable.

3. In the same way, they must clearly differentiate between the discussion section and the conclusion section. It is not differentiated.

We have tried to make that distinction clearer now.

4. In addition, there are occasions in the discussion that repeat the results, they should improve the writing.

Right. We have now changed parts that directly cite results

5.I worry about something that does not appear in the work, and it is the way of selecting the sample, and the degree of representativeness of it.

We have now added more information. p6

6.In addition, in a longitudinal study there is usually an aspect that is known as sample mortality. I ask the authors about this and I think it must be incorporated or pointed out.

We don't have access to mortality, unfortunately. However, we have brought this up in the discussion.p20