Author’s response to reviews

Title: A cross-sectional and 6-year follow-up study of associations between leisure time physical activity and vertebral fracture in adults

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Author’s response to reviews:

We thank the reviewers for helpful comments. We have made our best efforts to address the comments. Although, we were not able to find all your comments on the pages and lines referred to, but we did our best to figure it out. Changes to the manuscript are shown with track changes.

Editor Comments:

Please more explicitly state in the discussion that no imaging occurred at 2001 visit, and that a decline in physical activity may be due to fractures closing to that time point.

We have now added a line stating that no imaging occurred in 2001, pg 21, lines 390-391. Possible effects on PA were already on pg 21, lines 395-396.

Others:

- include email addresses of all authors

We apologize, but we were not able to find placement for the other (other than corresponding author) email addresses in the manuscript in your journal guidelines. The email addresses are:

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Reviewer reports:

Gustavo J. Almeida, Ph.D. (Reviewer 1):

- Pg 19, lines 340-341: It is important to expand the discussion here by adding why the authors believe that women in the "moderately/ high intensity" group were less likely to have a vertebral fracture as compared with women in the "low intensity group". Consider adding.

We could not find this on page 19. Are you perhaps referring to pg 15, lines 344-345 (earlier version, currently pg 15, lines 278-280)? In that case, that is on our results. We are stating:

“We found a significant association between physical activity intensity and vertebral fracture in the unadjusted model, with women in the “moderately/ high intensity” group being less likely to have a vertebral fracture as compared with women in the “low intensity” group (OR 0.53, 95% CI: 0.34-0.83). However, the association was no longer significant in the adjusted models”.

We return to this in our discussion, pg 19, lines 422-431 (earlier version, currently pg 19, lines 347-356):

In our study, a significant association between physical activity intensity and reduced risk of vertebral fracture in women was found only in the unadjusted model, but this association was no longer significant when adjusting for multiple confounders. In our opinion, this indicates that the relationship of physical activity intensity with reduced risk of vertebral fracture is complex and possibly confounded and mediated by other factors. Age, in particular, appears to mediate the relationship. Ageing is associated with decreasing physical activity levels [23]. As seen in our
study, the significant unadjusted relationship between physical activity and risk of vertebral fractures was no longer significant when adjusting for age and other possible confounders.

We didn’t expand our discussion on this topic, because it became a little bit unclear for us if the changes above were already noted. We are however prepared to add more that if the reviewers find that this will add to the overall message of the study.

- Pg 19, lines 342-343: Your sample was >50yo, so I don't believe that it is an issue.

Apologies, but we can not find anything related to this on pg 19, lines 342-343.

- Pg 19, lines 345-346: Please revise this sentence: sedentary time increased while leisure time increased? It is not clear the point you are trying to make.

We are sorry, but we have trouble finding the lines you are referring to. We could not find that sentence on pg 19 or on lines 345-346. And, we didn’t find it with the search function either.

- Pg 22, lines 413-414: There is a huge disconnect between these two sentences. How about continue discussing about the change in PA and vertebral fractures? How many of your subjects change their PA due to fracture? Were they more or less active after the fracture?... Expand on that.

Would not find this either, lines 413-414 can not be found on pg 22. Perhaps pg 21, lines 465-468 on the previous version and pg 21, lines 389-392 on the current? Vertebral fracture was measured only one time, during the second data collection in 2007-2008. Therefore, we are not able to discuss about the change in physical activity after the fracture since we can not pinpoint it.

Moreover, adding validity and bias from self-reported questionnaires completely detracts the reader from what is important, i.e., the effect of fractures on PA. In my opinion, discussing validity of questionnaires to measure PA is not necessary.

The rest of this paragraph can be removed and, at the beginning of the next one, simply mention that it is known that measuring PA using questionnaires is not ideal due to potential under- or over-estimation of activity participation but that's how data on PA was collected in the sample we have analyzed from the Tromsø study.
Editor’s comment on the previous view letter April 29th was following:

Assessment of physical activity: Please provide evidence for the validity of the physical activity questions (besides the first question, which was validated by Emaus). If the other questions have not been validated then it may be prudent to remove them from the paper.

Therefore, we did not do changes regarding discussing validity, but are prepared to do so.

- Pg 23, lines 425-426: How come "no objective PA data was accessible"? How about the subjects included in Emaus et al. [36], weren't they part of your sample?

There were approximately 300 persons from the Tromsø 6 that participated Emaus et al. activity study. Those people were 40-44 yr and not all of them had taken DXA-scans. We don’t know the exactly how many had taken DXA-scans because the data from the activity study and Tromsø 6 data are not connected. But based on the total number of participants on the Emaus et al. activity study, their age and missing DXA-scan, we can safely assume that there are not many participants in our study with objective physical activity data, if any.