Author’s response to reviews

Title: Obesity, change of body mass index and subsequent physical and mental health functioning: a 12-year follow-up study among ageing employees

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Editor Comments:

1. Please rename your 'Ethics approval' section 'Ethics approval and consent to participate' and to provide a consent statement here too.

2. Please remove your 'Consent to participate' section.

Response: We changed the “Ethics approval” section to 'Ethics approval and consent to participate” and removed the “Consent to participate” section.
Response to the Reviewer: 1

This study presents a somewhat traditional look at associations between SF-36 scores and weight change. What makes the study unique is the extended follow-up time (~10 years) and large sample size (N=5668). The methods and analyses were appropriate. The manuscript is well-written. My biggest concern is that I can't answer the question, "What does this add?" There are many reports of associations between the SF-36 and weight/weight change. Unfortunately, I don't feel like I learned anything new when I read this manuscript.

Response: Thank you for the comment. As reviewer 2 writes, the association between weight change and physical and mental health functioning is important to study especially among ageing employees. It is in the general interest to extend working careers, and therefore, it is important to study factors related to health functioning among ageing employees. Firstly, because people are staying longer in working life due to increased life expectancy and retirement age (Christensen K, et al. Ageing populations: the challenges ahead. Lancet. 2009;374:1196–208,) and secondly, because health functioning is closely related to work ability and quality of life (Ware JE, et al. Overview of the SF-36 Health Survey and the International Quality of Life Assessment (IQOLA) Project. J Clin Epidemiol. 1998;51:903–12.).

Due to our large sample size and repeated follow-ups we were able to examine the change in health functioning scores separately among women and men and to adjust for several important covariates. The association between weight and physical health functioning is well studied, but the association with mental health functioning has remained poorly understood. Regarding the association between weight change and health functioning, there are not many studies on the association. As discussed in the introduction of the manuscript (page 5, lines 98-101), some large scale studies have only included women and some have been relatively small scaled, especially in Europe.

Response to the Reviewer: 2

1. The topic is bit confusing and misleading as it says "weight change" which is in fact based on BMI according to the results. This should be made clearer both in the topic and in the study aim (abstract).
Response: Thank you for the comment. A percent change in BMI and a percent change in weight in kilograms gives the same results as long as the height is stable. We added a comment about this in the methods (page 7, line 145-146) and clarified the title: “Obesity, change of body mass index and subsequent physical and mental health functioning: a 12-year follow-up study among ageing employees”, and the study aim (page 2, lines 38-39): “We aimed to examine whether obesity and change of body mass index among normal weight, overweight and obese women and men associate with changes in physical and mental health functioning.”

2. What does key covariates mean in the background of the abstract?

Response: The included covariates, perhaps misleadingly called key covariates in the background section, are mentioned in the following “Methods” section. We changed “key covariates” to “covariates” in the manuscript to make it clearer.

3. In introduction page 5, line 90-92, the sentence talks about the weight-loss (>6.75 kg), but it is unclear which study was cited for this source as the reference 15 does not match with this.

Response: Thank you for the comment. The reference numbers have falsely remained unchanged from a previous version. Number 15 should be number 13. We checked that the rest of the references are correct.

4. In the title the authors stressed that their study was conducted among ageing employees but background lacks information on why this study/association is important among ageing employees?

Response: There are many reasons to why ageing employees are important to study. Due to increased retirement age and life expectancy the number of older employees is increasing. As health functioning is closely related to work ability but also ageing it is important to study factors
associated with health functioning among the ageing employees in order to maintain good work ability and to prevent disability. We clarified this in both the introduction (page 4, lines 74-78) and the discussion (page 20, lines 354-355).

5. The second aim of the study was to examine whether "key covariates" affect the association. However how this aim was realized is never clear in the texts or in the statistical analysis.

Response: The covariates are studied in the adjusted models and the results are shown in tables 3 and 4. The overall adjusting effect was small and only minor changes were seen after adjusting for the covariates in models 2-4 (sociodemographic factors, health behaviours and somatic health). The results of the adjustments are mentioned in the text (page 15-16, lines 270-272). Unfortunately, we could not make any broader conclusions about the covariates. To make it clearer, we removed the aim from the abstract and added the finding to the discussion (page 18, lines 300-302): “Adjusting for health behaviour and somatic ill-health showed small, but mainly statistically non-significant effects, on the findings.”

6. The study participants were municipal employees aged 40-60 at baseline, but how many of them were still working at the subsequent follow-ups should be presented. The physical and mental health function would be different for those who are working currently than those who retired. It would be interesting to see how BMI and physical and mental health functioning changes during retirement transition if you analyses those who retired during follow-ups separately (if possible).

Response: We included information about the number of retirees at phase 2 and phase 3 in the text (page 6, lines 134-135).

In this study we were interested in examining the association between weight, weight change and subsequent physical and mental health functioning. We have adjusted for change in self-reported employment status in model 2, but this did not have a major effect on the results. In this study, it was not in our interest to compare retirees and employed, even though the research question is relevant and interesting and could be the aim for a further study. Due to the few number of
especially retired men and the long follow-up time it is difficult to study the causality of the association and we could not be able to make any major conclusions about the association.

We do acknowledge, that there could be a problem with pooling retirees and employed. Due to an interaction between the female retirees and the employed in the repeated measures analysis for PCS we did sensitivity analyses for these groups, even though visually the curves for the weight groups were similar. In our sensitivity analyses we examined the employed and the retirees that retired due to non-medical reasons separately and found that the change in PCS was somewhat greater, but similar, among the retirees compared to the employed. Including the participants who retired due to non-medical reasons, did not affect the final estimates or the conclusions, and therefore we considered the interaction to be of removable type (Breslow N, et al. Statistical methods in cancer research. Volume I - The analysis of case-control studies. IARC Sci Publ. 1980) and pooled the employed and the retired in the final analysis. However, the participants who retired due to disability were different and therefore excluded.

We included information about these sensitivity analyses in the text (page 21, lines 371-377).

7. The discussion also lacks the perspectives of ageing working employees, which is important.

Response: Thank you for the comment. We have improved the discussion on the perspectives of ageing employees (page 2, lines 355-356). However, this growing population group is important to study because health functioning is closely related to work ability, quality of life and ageing.

8. In the study limitation it says that the data covered only middle-aged municipal employees, but if you study also includes retirees then that should be taken into account here.

Response: Please see comments 4, 6 and 7. We have included information on the retirees (page 6, lines 134-135) and extended the background (page 4, lines 74-78) and the discussion (page 20, lines 354-355; page 21, lines 370-376).
9. Page 2, line 43-44: follow-up response rate is provided as 70% but for which phase (follow-up)?

Response: The follow-up response rates are provided separately for phase 2 (82%) and phase 3 (76%) in the methods section, 70% is the response rate for both follow-ups. We clarified this in the abstract (page 2, lines 42-44): “The Helsinki Health Study cohort includes Finnish municipal employees aged 40 to 60 in 2000-02 (phase 1, response rate 67%). Phase 2 mail survey (response rate 82%) took place in 2007 and phase 3 in 2012 (response rate 76%).”

10. What was calculated as the measure of association should be provided in the methods.

Response: We assume that the comment regards the methods section on page 2. We made this clearer with including the word “score” (page 2, line 48): “The change in health functioning score (phase 1-3) was examined with repeated measures analyses.”