Reviewer’s report

Title: Joint association of physical activity and body weight with subsequent physical and mental functioning: a follow-up study

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Reviewer: Cindy Gray

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Joint association of physical activity and body weight with subsequent physical and mental functioning: a follow up study.

This is a interesting paper that examines the degree to which PA and bodyweight are associated with physical and mental health related quality of life. It reports the secondary analysis of data from two time points 5-7 years apart that were obtained as part of a cohort study of City employees in Helsinki. It is well written on the whole, although some parts could benefit from a little more thought about punctuation. There are also a few typos.

Title
Minor revisions
The title suggests to me that the paper is reporting the conduct of a follow up study, rather than secondary analysis of already collected data.

Abstract

Major revisions
P2, Results – I wonder if the authors could add something about the association between poor physical functioning and overweight? Or at least make it clearer.

Minor revisions
P2, Line 4 and elsewhere – the first mention of body mass index in the abstract and main body of the paper should have the acronym as well as the full version; thereafter it should just be the acronym.

P2, Line 9 – “baseline survey respondents” rather than “respondents of the baseline survey”?

P2, Line 13 – Short Form 36 looks a bit strange – it would be better to also add the acronym. Also a short description of what the SF-36 is (i.e. a health survey) would be useful.

P3, Keywords – could “overweight” be included?

Background

Major revisions
P4, Line 21 can the authors justify the statement “We also took into account the intensity of the physical activity…” as I am not convinced that using MET hours per week really does this – could someone not end up in the high activity category through lots of walking and moderate intensity activity?

Minor revisions
P3, Line 19 “Studies on [the impact of?] both physical activity…”

Methods
The description of the Helsinki Health Survey etc is very clear.

Major revisions
P7, Line 10 could the authors provide some justification of why they used binge drinking rather than overall quantity to classify alcohol use?

Minor revisions
P5, Line 4 “aged 40, 45, 50, 55 or 60 years”

P6, Line 5 could the authors provide the minimum recommendation for physical activity to contextualize the cut-offs selected?

P6, Line 8 3 hours of jogging per week does not sound like low activity!

P6, Line 20-21 the sentence “These were compressed…in the US general population” needs rewritten.

P6-7, could the authors provide the cut-offs used for the lowest quartiles of the PCS and MCS in men and women?

P8, Line 2 could the authors provide clarification of which analyses used the high activity normal weight group as the reference.

Results
Major revisions
P8, Line 17 there are clear gender differences in binge drinking.

P9, Line 2-3 physical functioning appears to decline more at follow up in the inactive normal-weight group than in the high activity normal weight group. The least decline appears in the low activity groups?

P9, Line 9 could the authors provide clarification that these are the highly active groups. Do the confidence intervals between the inactive and highly active normal-weight groups at follow up overlap?

P9, Line 17-19 would it be clearer to say that being normal-weight and inactive, and being overweight regardless of activity level were associated with poor physical functioning?
P9-10 my reading of the Table 5 suggests that, after adjustments, the association between mental functioning and physical inactivity in normal-weight adults disappears? It remains in the overweight cohort.

Minor revisions
P9, Line 5 does the first sentence in this paragraph refer to baseline or follow up or both – could clarification be provided?

P9, Line 12 “joint” is not needed here – its addition confuses the meaning of the sentence, could this be changed to “being inactive and overweight”?

Discussion
Major revisions
P10, Line 10-14 My reading of the findings does not entirely agree with this interpretation – my understanding is that the only association with poor mental functioning remaining after adjustments is for inactivity and overweight? The increase in the OR for poor mental functioning does appear to only increase between the less active and inactive groups, but this is not highlighted in the results section – and is the difference significant?

P12, Line 1 see point above about overlapping confidence intervals between the inactive and highly active normal-weight groups at follow up?

P12, Line 2 the authors speculate that the small differences in mental functioning between the less active and highly active groups may reflect the high physical activity cut off point between these groups, but two paragraphs below they say they have conducted sensitivity analyses using lower cut off points and that the results did not change substantially.

P13, Line 8 most studies that I am aware of do find that people overestimate their height and underestimate their weight so I am not convinced by this argument.

Minor revisions
P10, Line 6 could the authors add clarification that overweight and physical inactivity AT BASELINE contributed to poor physical functioning AT FOLLOW UP?

P13, Line 13 is this best paper to use to evidence reliability of the SF 36, as it examines older populations and also does not appear to look at the PCS or MCS as far as I can see?

Discretionary revisions
P 10, Line 5 should clarification that these were city of Helsinki employees be provided (alternatively just say adults)?
**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

'I declare that I have no competing interests’