Reviewer’s report

Title: Physical activity, obesity and mortality: does pattern of physical activity have stronger epidemiological associations?

Version: 0 Date: 16 Aug 2017

Reviewer: Jonathan Rawstorn

Reviewer's report:

General comments

The authors propose operationalising PA as a long-term pattern may improve estimates of health and mortality risk in comparison to single time point measures, and distal single time point measures in particular.

The authors demonstrate that long-term PA patterns may be comparably or more strongly associated with some, but not all, key indicators of overweight and obesity, as well as mortality outcomes. In particular the authors note long-term PA pattern may be a better predictor of risk than distal/baseline measures alone.

The hypothesis has intuitive merit as it aligns with mechanisms underlying adaptations that promote improved body composition and mortality. This link to first principles strengthens the rationale for the authors proposed approach, and the primary data reported in this manuscript provide additional support. The authors' conclusions are well supported by the data and can provide important guidance for PA epidemiology researchers. The utility of this guidance is enhanced by the relatively simple methodological process for classifying and analysing PA patterns.

The manuscript is generally well written, although addressing minor grammatical and typographical errors throughout will improve its quality. I have also included a small number of specific comments below.
Specific Comments

1. Abstract, background: Suggest briefly operationalising "PA patterns", it is unclear in the abstract what you actually mean when using that term.

2. Abstract, results: Suggest briefly defining categories of PA pattern such as "active maintainers", "inactive/low maintainers", and "sport pattern". They are well defined in the main body, but brief descriptions in the abstract would also be appropriate.

3. Abstract, general: The link between the results and conclusions is not immediately apparent, and it may be perceived that the conclusions are not strongly supported by the data. This was not an issue in the main body of the manuscript, and it is likely simple editing of the abstract will more intuitively communicate how the authors arrived at their conclusions.

4. It seems odd to classify consistent moderate active travel across T1 and T2 as a "mixed pattern", together with people whose active travel increased or decreased across that period. The authors do note in their discussion that most participants were either low or high active travel maintainers, and I realise that may make attending to the problem difficult. However, I wonder whether their discussion of the limitation should be expanded to also acknowledge that potential masking effect of including 'moderate maintainers' in the "mixed pattern" stratum.

5. P8L2, you have defined "activity maintainers", but used "active maintainers throughout the remainder of the manuscript. Please amend.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes
Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review? 
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

Quality of written English
Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

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