Reviewer’s report

Title: Interrelationships among sedentary behaviour, short sleep, and the metabolic syndrome in adults

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Reviewer: Paddy Dempsey

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This cross-sectional study examined the associations of sedentary behaviour with metabolic syndrome (and its constituents), controlling for sleep duration. Sleep is an important leg in the ‘triad’ including physical activity, and diet. While current ‘measurements’ of sleep duration are far from robust, sleep, and its relationships with cardiometabolic health, is an important factor for physical activity and sedentary behaviour researchers to consider, thus further research attention is warranted.

In this study, sedentary (also assessed via screen time), light and MVPA time were assessed by accelerometer, while a ‘proxy’ for average sleep duration was used – which, for lack of a better measure, should be taken with a grain of salt. Nevertheless, the methodology and variable handling is explained clearly and the results provide a useful addition to the growing field of sedentary behaviour and its implications for cardiometabolic risk in adults. I have a few relatively minor queries and suggestions, but overall I am happy with the manuscript.

Major Compulsory Revisions

• Clarification is needed to distinguish between the current study and that of previous work (i.e. Buman MP, Winkler EA, Kurka JM, et al (2014). Reallocating time to sleep, sedentary behaviors, or active behaviors: associations with cardiovascular disease risk biomarkers, NHANES 2005-2006. American journal of epidemiology). What are the distinctions in the methodology and findings of the current analysis that are complimentary to such recent work?

• Line 120: While only those who had #4 valid days were included in the analysis, it is not clear on which days the assessment period fell (i.e. weekend vs weekdays). Could this be an important factor to consider given the distribution in sedentary, physical activity and sleep time at work and in leisure-time are likely to vary? To allow for this, perhaps only participants with #10 hours of wear time per day for a minimum of four days, including at least one weekend day, should be included in the analysis?

• Covariates: Given their potential effects on the cardiometabolic outcomes, was medication data available and considered? Such as lipid-lowering, anti-hypertensive, and aspirin medications (if available).

• Line 305: While accelerometers have many advantages over other measures of physical activity and are highlighted as a strength in this study – their limitations
should be acknowledged (e.g. accelerometers do not capture all activities, such as swimming, cycling or load-bearing activities, sleep). Additionally, accelerometers require several decisions regarding data reduction procedures (e.g., non-wear time threshold, cut-points) and there is currently a lack of consensus in the literature on the most optimal procedures to use. Furthermore, cut-points, although useful for summarizing the data, underutilise the wealth of information that is captured by accelerometers. Particularly in this case, the impact of sleep is more complex than simply duration differences. It is also likely that sleep will be overestimated in the current context.

Minor Essential Revisions

• Line 168: ‘outside the physiological range of sleep duration times’ seems vague. Further and more specific justification could this be made here.

Discretionary Revisions

• While not a focus of the paper, were any gender interactions identified? – given the gender differences that have been previously reported in sedentary behaviour research with cardiometabolic outcome measurements.
• Line 215: add space to ‘regression was’
• Line 233: add space to ‘TV and’
• It seems important to differentiate sedentary behaviour from sedentary ‘time’ with reference to the current study’s objective and screen based activities. Objective assessment of activity level, while more precise, is not able to differentiate the behavioural context.
• Non adjustment for obstructive sleep apnoea is a limitation. However, I note that this is acknowledged by the authors. Assumedly there is no information available to account for this? Perhaps that should be stated if so.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests