Reviewer's report

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

Version: 2 Date: 26 November 2012

Reviewer: Gavin Turrell

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Major compulsory revisions

1. As the authors note, the physical and mental functioning measures of the SF36 are continuous scales ranging from 0-100 with a mean of 50 in the US population. For analytic purposes, this measure was subsequently dichotomized into the lowest versus the other quartiles. In a recent article it was argued that “dichotomization of continuous measures....discards theoretically relevant information, reduces statistical power, and amplifies measurement error” (Lovasi GS et al. At odds: concerns raised by using odds ratios for continuous or common dichotomous outcomes in research on physical activity and obesity. Open Epidemiol 2012;5:13-17). Given this, can the authors please provide a rationale in the revised manuscript for re-scoring a reasonably normally distributed measure into a dichotomised measure? And why the lowest quartile for each measure of functioning: is there any evidence that this cut-point has clinical or policy relevance?

2. Also, why dichotomise BMI and again compromise the statistical and measurement properties of this variable; and why collapse overweight and obesity into the same group when it is likely that obesity will show a stronger association than overweight with functioning?

3. What was the basis for choosing the baseline covariates: why these and not others? Was there any theory or previous research that informed their selection? Obviously, the choice of covariates is important (and ideally should be informed by DAGs) so as to conceptually clarify their role as potential confounders, mediators or moderators. Adjusting for numerous factors in the absence of a rationale for their inclusion in the analysis can result in spurious associations and a loss of statistical power if the covariate is serving no useful substantive purpose.

4. Has an investigation of attrition been conducted on the follow-up data? Is the physical activity, BMI, or functioning status of those who dropped out different to those who stayed in? Do any important baseline factors (e.g. SES, BMI) predict drop-out at wave 2? Non-random attrition might have important implications for bias in the manuscript’s reported associations between activity/overweight and functioning.

5. If the analyses were initially conducted separately for men and women how
could it be determined that no interaction was evident? Formal tests of sex-interactions can only be undertaken on pooled data. From the text it seems that a separate analysis was performed for men and women and the pattern of results compared on the basis of visually inspecting the data: this approach might strongly suggest no interaction but that can’t be statistically ascertained without formal interaction tests being conducted to confirm (or reject) the observed pattern.

6. In a recent article about the use of odds ratios the authors concluded that “Use of odds ratios for common outcomes such as obesity may unnecessarily hinder the validity, interpretation, and communication of research findings”. Prevalence ratios are recommended instead (Lovasi GS et al. At odds: concerns raised by using odds ratios for continuous or common dichotomous outcomes in research on physical activity and obesity. Open Epidemiol 2012;5:13-17). In light of this, and given that the outcomes in this present study were common (i.e. 48% for overweight, 38% for highly active) can the authors please provide a justification for the use of odds ratios (rather than prevalence ratios) for their analyses.

7. Can the authors please discuss the implications of their study’s findings for public health policy, health promotion, or other types of interventions aimed at increasing population levels of physical activity and decreasing rates of overweight and obesity? At present, there is very little discussion about the policy implications of the findings. Where should governments be investing tax payers’ money and resources? These questions are especially pertinent in the context of ageing populations, increases in overweight and obesity, and likely increases in poor functioning as a result.

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

'I declare that I have no competing interests'