Reviewer's report

Title: The Impact of Waist Circumference on Function and Physical Activity in Older Adults: Longitudinal Observational Data from the Osteoarthritis Initiative

Version: 2
Date: 14 May 2014
Reviewer: Manfred Stommel

Reviewer's report:

Major Compulsory Revisions:

(1) The authors state that “Our previous work suggested that BMI in older adults suboptimally identifies adiposity. We have argued that other anthropometric measures, either in lieu of BMI or in addition to BMI should be used in older adults (Batsis et al Under Review J General Internal Med).” I do not dispute that the BMI “suboptimally identifies adiposity,” but the question remains: “so what?” Only if knowing a person’s adiposity improves our ability to predict outcomes (such as the quality of life measures used here), would it makes sense to use a separate measure of adiposity in addition to, or instead of, the widely used BMI. Thus, the issue is not whether the BMI is a good measure of predicting adiposity, but whether the adiposity measure adds anything to our knowledge and predictability of quality of life measures.

You state yourself that “we previously demonstrated in a similar population that BMI impacts quality of life and physical function[Batsis et al Under Review, Public Health Nutrition], and this current study suggests that abdominal obesity could be a separate predictor of poor functional outcomes. Future analyses could determine the impact of the combined or independent use of these metrics, in addition to evaluating the incremental predictive nature of these variables on long-term outcomes.” Since you have the data, why wait for ‘future analyses’? Why can’t you find out and state (in the discussion section) whether using the BMI or WC yields better predictability of the quality of life measures? For instance, if you ran the same regression models, except for using the BMI instead of the WC measure, which one would yield a better R-squared?

(2) Appropos the regression models with the continuous WC predictor: You only introduce the WC variable as a linear predictor, even though the results from the quartile analysis clearly indicate that the relationship is often not linear: for example: for the 60-70 group, the physical SF sub-score means for each quartile in Table 3 are: 45.9, 47.8, 46.2, 45.9. This suggests an inverted U-shaped relationship, which would require a polynomial regression of the 2nd degree. Several of the other mean outcomes for the four quartiles suggest such relationships. Thus, having the effect of WC presented by a single coefficient for the linear WC term amounts to mis-specifying the regression model.

Minor Essential Revisions:
(1) I am not fully persuaded by your arguments concerning the use of the Charlson Index as a control variable. This index is made up of several items indicating the presence of heart disease and also diabetes, for all of which central adiposity is a known risk factor. Thus, ‘controlling for’ this index amounts to partially controlling for an outcome associated with central adiposity. Since you present the unadjusted associations between the outcome measures and the WC quartiles, this is acceptable, but a better alternative would be to use a modified Charlson Index that removes the indicators that are potential outcomes of adiposity.

(2) Some sentences in the Discussion section got mangled:

“Lastly, our main predictor was using WC quartiles in line with previous author’s arguments in that it allows study (?) to study comparison of anthropometric indices[23].”

“Although our data was consistent with theirs, although (?), these authors did not specifically look at older adults, nor did they utilize PASE, SF-12 or LLDI as primary outcomes.”

(3) This sentence in the limitations section lacks specificity: “We agree that certain variables could conceivably have been omitted and/or excluded, and that others could have been considered in our analysis.”

**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'