Author’s response to reviews

Title: The relationship between body composition and cardiovascular risk factors in young Australian men

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Author's response to reviews: see over
Reply to reviewers - 19 July 2013

**Editor's comment:**
1. A minor revision is requested by the reviewer 1.
   Reply: The error has been corrected.

2. The author has a choice to revise the discussion according to the suggestion by the reviewer 2 or to rebut the comments.
   Reply: The comments were replied.

3. Agrees not to add the appendix table to the manuscript.
4. Correct like line 323 throughout the manuscript.
   Reply: The typographic errors have been corrected.

**Reviewer's report 1:**
Their response to my comment number 4, lines 103-107 (Methods section of the original manuscript), appears to contain an error that should be addressed in the final version of the manuscript.
This correction applies to lines 115-116 of the revised Methods section.
The authors state that "body fat-free mass was calculated by subtracting body weight from body fat content." I believe they meant to say, "body fat-free mass was calculated by subtracting body fat content from body weight." The error is easily corrected.

Reply: The error has been corrected.

**Reviewer's report 2:**
The authors seem to have missed the concern of Kelly et al (Ref 78) about the use of % fat mass over an index. The use of a fat mass index, which the authors attempt and summarize in an appendix to reviewers only, seems to be dismissed without sufficient justification. Their claim that fat mass indexes remain to be validated in longitudinal cohort studies and thus justifying the continuance of the % fat mass as the DEXA-derived variable of interest does not, in my mind, obtain. There are published papers in the literature indicating the improved classification of DEXA-derived indexes pertaining to various anthropometric components of adiposity, compared to BMI, with well-established cardiovascular risk factors--admittedly cross-sectional in nature; however, I would suggest that these findings being only "cross-sectional" associations are not sufficient to justify their exclusion and the persistent use of BMI and % fat mass as the criteria for classifying lean and overweight groups.

Reply: We agree that there are published papers in the literature indicating the improved classification of DEXA-derived indexes pertaining to various anthropometric components of adiposity, compared to BMI. We have shown in this study that three participants were erroneously classified as overweight using BMI. Our understanding is that the point here is to use % of body fat or "%fat corrected by height" index to classify the study participants. When we used the suggested "%fat corrected by height" index to classify the study participants into lean and OW groups,
there was no difference in the finding of this study compared to the findings using %fat to classify the participants. It is not clear to us if there is, and what is the most appropriate index/way - %fat or %fat corrected by squared height index - to classify the study participants into group. We agree with the reviewer & believe that both indices have merit (& limitations) & have thus presented the data using both indices.

Below we summarize three reasons for our doubts on the most appropriate index/way - %fat or %fat corrected by squared height index - to classify the study participants into groups.

- Firstly, we think that there is not enough evidence to justify the use “%fat corrected by height” index for classifying lean and overweight groups. Kelly et al (ref 78) also claimed that “fat mass indexes remain to be validated”. The last paragraph of the Kelly article say “Whether or not the use of the proposed FMI classification scheme will confer benefits over BMI in terms of predicting obesity-related morbidity or mortality will have to be investigated in future studies. The FMI classifications presented here are based on prevalence data, not disease risk, and therefore the clinical utility of the FMI classification scheme will not be known until data relating disease risk to FMI becomes available.”

- Secondly Kelly et al mentioned that “whole body fat… were normalized to height2 as suggested by Heymsfield et al.” However, adipose tissue scaled less consistently to height with low R values and high SEEs. On page 88 of the article by Heymsfield et al., 2007, it is mentioned that “bone and skeletal muscle scaled consistently to height with high R values, low SEEs, and with powers at or very near 2.” On the same page it is also mentioned that “Unlike the major lean tissues, adipose tissue scaled less consistently to height with high SEEs and low R values.” On the following page it is also mentioned that “The observations of the present study thus suggest the existence of a lean tissue “core” that scales consistently and strongly to height with a power not significantly different from 2.0. The corresponding associations for adipose tissue and fat mass are weaker, although _ values also did not differ significantly from 2.0.”

- Third, the sample used in Heymsfield et al., 2007 study is mentioned as being “relatively small”) and the need for larger and more representative samples is also mentioned, “Pending the study of larger and more representative samples, it thus seems reasonable that creating indexes of these and related components to height2 would allow for body-composition comparisons between subjects or groups differing in height.