Reviewer's report

Title: Body Mass Index and Measures of Body Fat for Defining Obesity and Underweight: A Cross-Sectional, Population-Based Study

Version: 1  Date: 7 March 2014

Reviewer: Masaharu Kagawa

Reviewer's report:

This is a large scale study that examined appropriateness of WHO's BMI cut-off points for underweight, overweight, and obesity by comparing agreement with percentage body fat (%BF) either measured by dual energy x-ray absorptiometry (DXA) or estimated using an equation. The results indicated that BMI is likely to underestimate individuals with large amount of fat deposition, particularly in males. Interestingly, the study also showed an underestimation of BMI for a prevalence of underweight in both genders. From the results, the authors concluded with a suggestion that an optimal gender- and age-specific threshold to define underweight obesity.

Overall, the manuscript was well presented and easy to follow. However there are a number of considerations throughout the manuscript, mainly in the methodology section. It is recommended the authors to consider issues listed below and explain more in details:

Major compulsory revisions

1. p5. There is no detailed information about sample characteristics, such as number of males and females in each age group as well as in each BMI category.

2. p6. The current dataset is a combined data which body composition was measured using two different DXA machines (Lunar DPX-L or Prodigy Pro). Since it has been suggested that data obtained from different machines, including different version, may not be comparable. Please provide an evidence that two DXA machines provide comparable results from the measurements of same individuals.

3. In the present study, body composition of 66 participants was estimated using a prediction equation. It is not appropriate to combine the body composition results obtained from actual measurements and estimation from prediction equation. Instead, the authors should exclude these 66 participants.

4. While %BF of participants was determined from the equation, an appropriateness of the equation to the study population is not known. Since the equation was derived from the same project, it appears the participants of the present study were the group of which the equation was derived from. If that was the case, it is not appropriate to use the equation to estimate body composition of
the participants.

Discretionary revisions

1. While the study topic is an important one, it is already well known that BMI is not a good index for obesity. Since there is a lack of strong statement on significance of conducting the present study, the authors should provide further rationale with more emphasis on reasons of focusing underweight cut-off point.

2. p4. While the authors cite references for the statement “This approach extends previous studies that utilised the World Health Organization (WHO) standard %BF values of 25% for men and 35% for obesity”, this statement is incorrect. As described in detail by other paper (Ho-Pham and Campbell, Mayo Clin Proc, 2011), WHO has not proposed any %BF cut-off points. Please revise the above statement and the rationale of the study.

3. p6. While the authors described a technical assistant for DXA assessments as a “trained personnel”, the authors should provide further details whether the assistant had adequate accreditation to operate the device.

Level of interest: An article of importance in its field

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.