Reviewer’s report

Title: Identification of an obesity index for predicting metabolic syndrome by gender: The Rural Chinese Cohort Study

Version: 0 Date: 28 Nov 2017

Reviewer: Edward Janus

Reviewer’s report:

Please include all comments for the authors in this box rather than uploading your report as an attachment. Please only upload as attachments annotated versions of manuscripts, graphs, supporting materials or other aspects of your report which cannot be included in a text format.

Please overwrite this text when adding your comments to the authors.

For this study The 2009 Joint (IDF, NHLBI, AHA, IAS, IASO) Interim statement agreed definition of Metabolic Syndrome (MetS) published in Circulation was used. Metabolic syndrome is present if three of five components are present. One of these is central obesity with specific cut-offs for gender and ethnic origin. For Asian populations the waist circumference (WC) cut-offs are 90cm or greater for men and 80cm or greater for women. In earlier IF definitions WC was a compulsory component and at least two of the other four components were required.

The authors test which of WC, Weight Height ratio (WHt), BMI and lipid accumulation product LAP (Calculated from WC and triglyceride concentration) is the best predictor of the presence of MetS and also to determine the optimal cut-offs of these indexes for predicting MetS for both genders.

The authors perform a detailed analysis of a large rural Chinese data set to address these questions.

A problem the authors need to discuss is that if y the outcome (MetS) and x the determinant (WC or WC plus TGs) correlate but x is a significant component of y then its a foregone conclusion that x and y will be highly correlated.

Also was the study intended to define the baseline characteristics predicting the presence of MetS at follow up. This is not clearly stated. At what time point was the diagnosis of MetS made. At follow up? This is unclear. It is implied in the discussion that this was the case. Making this clearer has implications for the point made above.

Other points

1. Methods- The exclusion process is unclear. How was known MetS at baseline determined?
2. Table 2 Males and females should be shown separately for the baseline study. Some information on the subsequent parameters should be shown if this is a longitudinal study in which some subjects have developed MetS at follow up.

Discussion is comprehensive and includes limitations and the implications of using the various predictors in different populations. A practical issue in applying results to population health in the real world is simplifying the rules which is how the Asian WC cut offs used in defining MetS were intended to be used. This aspect could be discussed.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

**Declaration of competing interests**
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?
3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

'I declare that I have no competing interests'

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal