Reviewer's report

Title: A novel quantitative body shape score for detecting association between obesity and hypertension

Version: 2
Date: 29 September 2014

Reviewer: Jong Yeol Kim

Reviewer's report:

Wang and colleagues sought to find quantitative body shape score that predict hypertension among Chinese men and women. The authors built six models using partial least squares path model based on BMI/WC/Hip and BMI/WC/WHR/WHtR. The predictive powers of BSS1 and BSS2 were compared with those of individual indices, and they argued the superiority of BSS1 compared with other indices. The motivation for the study is solid. However, this manuscript needs several major revisions.

Major

1. This manuscript requires English editing or correction in several points such as "pear-apple-shaped, Chilli-shaped" (p.3), “the AUC of BSS1 was significant larger” (p.8), “the same trend have” (p.8), and so on.

2. Study sample and measurements section: Data set collection and data selection for final data analysis are reasonable, but there are no descriptions on ethical approval, Institutional Review Board, and consent in method section.

3. Model structure section: The explanations of model structure were insufficient and very general, even though authors provided Figure 1. For the readers in various fields such as epidemiology, statistics, artificial intelligence, medicine, anthropometry, and so on, authors should describe the interaction between score, square box, arrows, and ellipse in more detail in Figure 1. Authors explain model workflows or framework of only one figure among several subfigures (a)~(f) (namely, the explanation of only one figure is enough).

4. What is the advantages and differences between the model suggested by authors and the model using a combination of WC, BMI, WSR, and WHR based on logistic regression, SVM, decision trees, naïve Baye, and so on? For example, can proposed model solve the multicollinearity (such as in page 10)? Authors can add the contents on advantages and disadvantages of model suggested by authors as well as differences.

5. Results section: Authors mentioned that “the AUC of BSS1 was significant larger than BSS2 as well as the four single indexes for female, and the same trend have also been found for male, though the statistical significance was only detected to WHR and WSR.” Actually, in Table 5, AUC of BSS1 is the best among all variables in both men and women. However, I think that the predictive power (AUC) of BSS1 is improved very little compared with that of BMI and WC, although there are significant differences between BSS1 and others in big
sample size. Authors should discuss whether or not the very little improvement of AUC (BSS1) has advantages of practical utility and practical measurement in medicine, epidemiology or medical information. In comparison of BSS1 and other individual indices, I think that BSS1 is more difficult to calculate, to build models, and to interpret the results.

Minor
1. Background section: Authors should add explanations for “pear-shaped” and “apple-shaped” bodies (for instance, with more weight around the waist…). Also, authors divided body shape into nine categories. Readers may feel confusion with regard to the words such as chilli, pear, apple, chilli pear-apple, and so on. Is it possible to explain the nine words (for example, apple-shaped” (with more weight around the waist)?
2. Study sample and measurements section: Authors should exactly describe the definition of hypertension. For example, “SBP#140mmHg and/or DBP#90mmHg.

**Level of interest:** An article of insufficient interest to warrant publication in a scientific/medical journal

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

No interest.