Author's response to reviews

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

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Author's response to reviews: see over
Author’s covering letter for initial submission

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

Authors:

Version: 1 Date: 25 March 2014

Comments: see over
RE: [A Resubmission] “A novel quantitative body shape score for detecting association between obesity and hypertension”

Dear Editor,

We once submitted the above titled manuscript (MS: 2028643895110625) to be considered for publication in your prestigious journal – BMC Public Health, and you and two reviewers have listed some insightful comments and critiques during the peer review process. We have revised the original manuscript according to you and two reviewers’ valuable suggestions. Specifically, we have (i) justified the roles of data simulation and real data analysis, (iii) re-explained the definition of Hypertension, and (iii) made the necessary changes for Table 2 and Table 3.

Following your instructions, we now resubmitted the revision as a new manuscript. Point-by-point responses are attached and given below. Your and the reviewers’ constructive comments have led to great improvement of the paper and we hope we have addressed all the concerns satisfactorily.

We deeply appreciate your help and consideration of our manuscript as a resubmission, and look forward to hearing from you

Best regards.

Fuzhong Xue, Ph.D.
Editorial comments:

The validity of your results depend on concise definition of hypertension. You provided no information about the technique of blood pressure measurement, the way how self reported hypertension was retrieved ("told by a doctor" is not sufficient)

Response: We apologize for this confusion. Adult hypertension was determined (according to the IDF cut point (SBP/DBP $\geq 140/90$ mmHg) or self-reported current use of antihypertensive medications (see page 5, line 9-10).

BP was measured by trained examiners on the right arm using a mercury sphygmomanometer according to a standard protocol. The three BP values were measured and the average of three readings were chosen as the BP values (see page 5, line 1-3).

Actually, the public CHNS data have been extensively used elsewhere. We have also added these comments and some references to our revision (see page 4, line 20-28).

Reviewer

The authors of the paper studying association between obesity and hypertension have to have a concise definition of hypertension. In this respect this paper can't reach a valid conclusion ("Hypertension was defined as "SBP>140mmHg, DBP>90mmHg or being previously diagnosed by a doctor. "). no matter how sophisticated statistical methods are used. There is also no information about the treated hypertensives who have SBP and DBP less than 140/90. Furthermore there is no information in the "Methods" section how was during the National Survey the blood pressure measured? Was it one casual measurement? What kind of instruments were used? Mercury sphygmomanometers? Digital instruments? Thus essential information is missing.

Response: Thanks for your insightful comments. Hypertension information is indeed necessary for our manuscript, and the editor has also pointing out this. Adult hypertension was determined (according to the IDF cut point (SBP/DBP $\geq 140/90$ mmHg) or self-reported current use of antihypertensive medications (see page 5, line 9-10).

BP was measured by trained examiners on the right arm using a mercury sphygmomanometer according to a standard protocol. The three BP values were measured and the average of three readings was chosen as the BP values (see page 5, line 1-3).

Actually, the public CHNS data have been extensively used elsewhere. We have also added these comments and some references to our revision (see page 4, line 20-28).

For the information you mentioned about the treated hypertensives who have SBP and DBP less than 140/90, we have re-checked the CHNS data carefully, and There are totally 698 hypertensives, with 32 missed, only 133 have SBP and DBP less than 140/90 among totally 698 hypertensives.
Reviewer

1. In this manuscript, the authors performed sophisticated analyses. However, the authors should also focus on the implication of these findings to current public health and clinical practices. For example, why these scores are important; what are their performances compared to traditional anthropometric indices for obesity such as BMI, WC, WHR, WSR? how to use them in public health and clinical settings?

Response: Thanks for your valuable suggestions. A good prediction model of hypertension with higher sensitivity and specificity is quite important for its primary prevention. So far, much debate existed about how to choose the best appropriate index on behalf of the relationship between obesity and hypertension. We attempt to establish a comprehensive index based on previous studies, named body shape scores (BSS), expect to improve the ability of prediction model compared to traditional anthropometric indices for obesity such as BMI, WC, WHR or WSR. The proposed BSS showed better performances than the traditional indices you mentioned above, illustrating it can further improve the prediction ability and intervention effect of obesity in public health and clinical practice.

2. In the introduction or methods, please justify the roles of data simulation and real data analysis in answering the research question.

Response: Thanks for pointing this out, it is indeed necessary to justify the roles of data simulation and real data analysis in our manuscript. Simulations are conducted here to illuminate whether the proposed model is stable and efficient, and whether it can be feasible for data analysis. Statistically, any novel model should not be used until its stability and efficiency can be confirmed. Moreover, real CHNS data analysis is further used to check whether the proposed model is in line with reality. We have added these comments in the revision (see page 4, line 9-11).

3. In the Results and Table 5, the authors suggested that BSS1 was better than BSS2 and other anthropometric indices based on the P value < 0.05. In fact, absolute AUC values are very similar across measures, please justify. Furthermore, the authors suggested that the sample size is not large enough. In fact, I might think that the sample size is quite large to detect small different. Looking at the data, a reader could also argue that other anthropometric indices such as WC or BMI provide very similar AUC values to BSS1 and BSS2 and are simpler to be use, thus should be promoted.

Response: Thanks a lot. In this manuscript, we mainly focus on establishing a comprehensive index to improve the prediction ability compared to traditional anthropometric indices for obesity such as BMI, WC, WHR or WSR. The proposed BSS1, though just having a little higher AUC values, was still statistically significant better than other indices, indicating that BSS1 can indeed have superior performance. Actually, just like many previous large sample studies (see our reference 2 and 31), the difference in AUC value is usually small when comparing different indices, and it seems that, to some extent, little increase cannot be unnecessary. On the other hand,
the calculation of proposed BSS is not quite complex, and it is not quite difficult to use in the public health and clinical practice. We totally agree with you that it is inappropriate to say our sample size is small here, and we have deleted this sentence following your instructions (see page 8, line 8-10).

4. The sample covered a wide age range (18-87 years). Did the authors examine the age variation in the association?

**Response:** Thanks for your constructive comments. In our paper, the construction of the new body shape score is what we mainly focus on, and age is adjusted as a covariate in Partial Least Squares Path Model (see Figure 1). We acknowledge that, as you mentioned, it is important to explore age variation in the association, and will attempt to work on it in the future.

5. Keywords: should add Chinese adults, China Health and Nutrition Survey, anthropometric indices.

**Response:** All keywords you suggested have already been added (see Key Words).

6. Methods, under study sample and measurements: Which wave of CHNS had been used and why?

**Response:** Thanks. Most waves of CHNS included the year of 1993, 1997, 2000, 2004, 2006 and 2009. In order to use enough sample to validate the proposed model, we used all waves of CHNS study, and only took the first survey result for repeated measurements of each individual. These explanations have also been added in the revision (see page 4, line 20-27).

7. Methods and Results: The authors presented heavily about the Simulation analysis. However, few data were presented in the results. Please consider revising.

**Response:** Thanks for your comments. Simulations are just conducted to illuminate whether the proposed model is stable and efficient, and whether it can be feasible for data analysis. Based on your suggestions, we have shorten the Simulation section to make it more clear but concise (see page 6, line 2-15).

8. Please justify the usefulness of Figure 1a and 1b, if not necessary the authors might drop them.

**Response:** Figure 1a and Figure 1b are used to present how the proposed BSS and PLSM model can be constructed, and we have kept them left.

9. Table 1, please indicates exact value ranges (e.g., BMI 24-27.9; 28-40; same with WHR). Also, please use a min value of BMI and WHR, not Zero.

**Response:** Table 1 only listed the commonly used definition of nine types of human body shape by BMI combination with WHR, it is not for some specific data and the exact minimum and maximum values can’t be determined. We put BMI 24- to 24-28, WHR 0.85- to 0.85-0.90 for male and WHR 0.80- to 0.80-0.85 for female.

10. Table 2, consider revising the table title because other information was included in this table. Might add the prevalence of hypertension and prevalence of certain obesity classifications based on anthropometric indices.

**Response:** We totally agree with you. Besides revising the table title, the prevalence of hypertension and prevalence of certain obesity classifications based on anthropometric indices have all been added (see table 2 in the revision).
11. Table 3. Title mentioned about BMI, WC, WHR, WSR and Hip, but the table did not have all pairwise comparisons. Why BSS1 and BSS2 scores were not included in this table?
Response: Thanks for pointing this out. We have re-checked Table 3 to make sure all pairwise comparisons have been done, and BSS1 and BSS2 scores are also been included (see Table 3 in the revision).

12. Table 6. Why only BSS1, not BSS2 score in this table?
Response: since the BSS1 score was shown to be better than BSS2 and other indicators (BMI, WC, WHR, WSR), so we only listed BSS1 in table 6.