Reviewer’s report

**Title:** Association of Blood Pressure with Development of Metabolic Syndrome Components: a Five-year Perspective Cohort Study in Beijing

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**Reviewer:** Chun-Hsien Hsu

Reviewer’s report:

This manuscript presented a study regarding the association of blood pressure with the development of metabolic syndrome components. The topic is interesting and the writing is acceptable. However, there are some issues that the author should modify, including the interpretation of statistical results and conclusions for the clinical practice.

- Major Compulsory Revisions

Methods, Statistics, Results

1. In Figure 1, the comparison of MetS incidence among groups (i.e. different BP groups or gender) was not adjusted for other confounding variables (covariates) at baseline, such as age or lifestyle. The readers cannot realize the underlying causes of significant difference are derived from the covariates or the BP itself.

2. The results showed that the high BP group (>140/90 mmHg at baseline) had a higher risk of MetS (at follow up). The results are rational. However, high BP itself is a component of MetS, so there is a strong relationship between high BP and MetS. Take blood glucose for example. High blood glucose is the component of diabetes. It has been proved that impaired fasting glucose and impaired glucose tolerance are high risk status for developing diabetes. Thus, the comparison of MetS incidence among different BP groups should be adjusted in some ways.

3. The authors adopt “association rule” analysis which is often used in data mining to make inductions of the various combination of transition from baseline to follow-up. However, the method was based on a pure mathematical model but not probability model (statistically). For example, the most frequent combination of transitions among male subjects with high BP was I+P#I+P+G, so the authors concluded that high fasting glucose was a secondary risk factor. Nonetheless, based on such a mathematical model, no formal statistical index (i.e. P value, odds ratio) can be reported. I am not completely convinced that high fasting glucose was a “significant” risk factor for subjects with high BP at baseline.

Conclusions

1. The incidence of MetS increased in parallel with the increase in BP. People with optimal and normal BP levels were less susceptible to developing MetS over
time, whereas abnormal BP seemed to be a pre-existing phase of MetS.

Abnormal (high-normal and high) BP itself is a component of metabolic syndrome. Although the conclusions are reasonable, the statistical analysis should be re-performed with this consideration.

2. High-normal BP was a crucial status for MetS prevention.

There are 149 male subjects with high-normal BP and 43 of them (28.86%) developed MetS at the follow up (Figure 1). The incidence of MetS was second high among the four BP groups, implying the high-normal BP might be a risk of MetS. However, the most frequent combination of transitions was P#H and included 26 subjects (17.45%) (Figure 2). As for the female, 19 of high-normal BP (24.05%) developed MetS at the follow up. The most frequent combination of transitions was P#H, which included 18 subjects (22.8%) (Figure 3).

The numbers of developing MetS and P#H are nearly the same. How can the conclusion be drawn by that? Only the statistical result cannot interpret why it is crucial for MetS prevention. In addition, the SBP in high-normal BP and high BP groups decreased significantly at follow-up in both genders, according to the data from Table 1 and 2. The authors should discuss more about the causal relationship.

- Minor Essential Revisions

Method:

1. Strictly speaking, this study was not a prospective cohort study. The inclusion criteria must include subjects’ health records in both 2006-2007 and 2010-2011, instead of enrolling 2006-2007 and following up for 5 years. As a result, it was a retrospective cohort.

Results:

1. Only the median age of subjects was shown. This is not enough for clinical practice. The authors should also provide the data of the mean of age (mean ± SD), or the distribution of age, which can be performed by histogram or boxplot.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.