Author's response to reviews

Title: Development of waist circumference percentiles for Japanese children and an examination of their screening utility for childhood metabolic syndrome - a population-based cross-sectional study

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We would like to thank the reviewer for the valuable comment. Based on which we modified our manuscript. Please note that the modified parts are indicated in red in the revised version.

**Major Compulsory Revisions**

1. For the WC cutoff at 90th percentile, ROC curve analysis showed that AUC was 0.5386 (95% CI: 0.528–0.55), which is indicating poor discriminative ability (also low sensitivity & specificity) of this cutoff in identifying childhood MetS (result section: page 8, 19-22).
   Therefore, this cutoff may not appropriate for the screening of childhood MetS.

**Response:** The reviewer’s comment is completely reasonable. Behind such low AUC values, the sample size of each group (higher, or lower than the cutoff point) was quite different, much smaller size of WC > cutoff percentile than that of WC < cutoff percentile. Furthermore, the number of MetS in this study was very small, that could lead to such low AUC.

   We added the data for sensitivity and specificity (page 8, 20-24). High sensitivity of WC 90th cutoff because of no MetS subjects with WC < 90th, may support the usefulness of WC 90th percentile for screening childhood MetS in Japan.

   As you claimed, ROC analysis with the setting of a single explanatory variable (high or low of cut off value) using the data involving some extent bias was far from complete. We added some descriptions for the weakness in this study due to poor statistical analysis (page 11, 17-19). Following your worthful comment, we changed several sentences to make it clear that the statistical analysis was not enough to lead the conclusion (page 3, 16, page 8, 23-24, page 10, 4-7, and page 11, 19-23).

   Overall, the main achievement of our study is the establishment of the new set of WC percentiles for children in Japan. We believe that this could make an important step in childhood health promotion. For getting solid evidences on the validity of those WC percentiles for childhood MetS screening, further studies must be necessary.