Author’s response to reviews

Title: Associations of pubertal stage and body mass index with cardiometabolic risk in Hong Kong Chinese children: a cross-sectional study

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Author’s response to reviews: see over
Reviewer's report

Title: Pubertal stage: Prediction of cardiometabolic risk by BMI and waist circumference

Version: 3  Date: 30 January 2015

Reviewer: H. David H McCarthy

Reviewer's report:
There are some minor typographical errors but generally the manuscript is well written and concise.
Response: Thanks for your advice. We have corrected the typographical errors.

Quality of written English: Needs some language corrections before being published
Response: The document has been edited by a professional language editing company.

Reviewer: Ulla Sovio

Reviewer's report:
This is a cross-sectional study on the interaction effect of pubertal stage on the prediction of cardiometabolic risk by body mass index (BMI) and waist circumference (WC).

Discretionary revisions:
1. The authors state their aims well at the end of the background section.
   However, the manuscript title and the running head do not adequately reflect the study question. These could be improved.

Response: Thanks for your advice. We have changed the title to: “Associations of pubertal stage and body mass index with cardiometabolic risk in Hong Kong Chinese children: a cross-sectional study”.
Response: The running head has been changed to: Associations of pubertal stage and BMI with cardiometabolic risk.

2. The authors could present a power calculation for identifying the main effects as well as interactions with their sample size, using a range of plausible effect sizes.

Response: We have now included a power analysis sub-section to the Methods section as follows:
“A sample size of 828 boys and 1157 girls would allow a regression analysis of BMI and pubertal stage to detect an interaction effect as small as R2 = 0.01, R2 = 0.008 and R2 = 0.006 with, respectively, 86%, 78% and 65% power for boys, and 95%, 90% and 80% power for girls, respectively, at 5% level of significance, given that the main effects of BMI and pubertal stage have already accounted for 10% variance of the cardiometabolic risk score.” (Page 11, Lines 176–181)

Minor essential revisions:

3. The abstract needs particular attention as it is not easy to read without reference to the manuscript text, e.g. cardiometabolic risk scores alpha and beta are not defined in the abstract. Additionally, the language could be much improved in the abstract, and unnecessary repetitions could be removed (p. 4 lines 3-7). In the main text, the English is adequate in places but not throughout. Grammatically incorrect sentences such as “In addition, this study was lack of sex hormones data due to funding limitation” (p. 15 lines 316-317) should be corrected.

Response: We have revised the abstract and defined the cardiometabolic risk scores alpha and beta. We have also removed unnecessary repetitions in the text, and the paragraph has been revised.

The entire manuscript has now been edited by a professional language editing company. The sentence in p. 16 lines 305-306 has been amended (“In addition, this study lacks sex hormone data due to funding limitations.”).
4. Since the study is cross-sectional, it is problematic to talk about prediction and moderation. I suggest the authors would replace these expressions by association and interaction, respectively.

**Response:** We have adopted the suggestion and made the changes accordingly throughout the manuscript.

5. The authors should state clearly how they took account the sampling design (classes nested in schools, schools nested in districts) in their data analysis. In the study of the association between pubertal stage and CMRFs, a trend test should be used instead of Chi-square test.

**Response:** Thank you for this important concern. We understand the hierarchical nature of the data. If the students recruited from the same class/school/district (cluster) are similar with respect to the outcome measures (cardiometabolic risk factors), an omission of the variation due to clustering (or intra-correlation within the cluster) may lead to under-estimation of the standard error of the regression coefficients, and hence result in an inflated Type I error rate. However, the outcome variables of the study are all individual, physiologically based measures. Students recruited from the same cluster are unlikely to be correlated with one another with respect to these measures. In this regard, the variation between clusters can be ignored as compared with the variation between individual students. Therefore, the analysis of the study was conducted on the basis of a single-level model accounting for variations between individuals only. Since we did not have any priori hypothesis on the trend of the cardiometabolic risk factors across the three pubertal stages, we prefer to keep using the one-way ANOVA and chi-square test for the comparisons in the present Table 2.

6. p. 10 line 182 should read “The highest rate of boys”, not “The highest rate of children”.

**Response:** Thank you for pointing out the error. We have corrected it. “The highest rates for boys of increased WC (23.4%), high BP (28.3%), high TG (14.4%),
high CMRFs clustering (4.6%), overweight (37.6%) and obesity (18%) were all found in the pre-pubertal group.” (p 11 line 193–195)

7. Table 2 left column: units for cardiometabolic risk scores should be stated. Are they mean (SD)? Please add and explanation to the footnote. For the risk factors above, add N(%).

Response: Thank you for pointing out the insufficient clarity of Table 2. We have defined the units and added an explanation to the footnote.

8. The discussion on limitations should include the cross-sectional design of the study.

Response: We have added the limitation of cross-sectional design of the study to the manuscript as follows:
“Last, this was a cross-sectional study and no moderation or causal relationships could be established even though there was an interaction effect of pubertal stage on the association between cardiometabolic risk and BMI. A longitudinal study is needed to further examine any moderation effect or causal relationship.” (p 17 line 315-318)

Major compulsory revisions:
9. The authors should state why they calculated two different risk scores: alpha with and beta without WC adjusted for sex and age. The authors predict these risk scores by WC and BMI. I see that it is problematic to have WC as a predictor in the model where also the outcome includes a transformation of WC. I suggest the authors would only predict by BMI to avoid this problem.
This implies the removal of tables 3a and 4a from the manuscript and re-writing of p. 10-12.
Alternatively, if the authors want to predict CMRFs by WC, they should only consider the risk score beta as the outcome.

Response: We agree with your suggestion that the study should examine the associations using only BMI. Therefore, we have changed Tables 3a and 3b to only examine the interaction of the cardiometabolic risk score β associations using BMI. The original Tables 4a and 4b have been renamed as the revised Tables 3a and 3b.
We have also revised the main text.

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

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

The document has been edited by a professional language editing company.

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

**Declaration of competing interests:** I declare that I have no competing interests.