Reviewer's report

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

Version: 3 Date: 30 January 2015

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.

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.

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.

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.

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.

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

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(\%).

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

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.

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

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

Declaration of competing interests:

I declare that I have no competing interests.