Reviewer's report

Title: Abdominal obesity and low physical activity are associated with insulin resistance in overweight adolescents: A cross-sectional study

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Reviewer: Silvia Regina Saldiva

Reviewer's report:

General comments: The manuscript addresses an important public health condition: the possible mechanisms for the development of insulin resistance amongst adolescents. Authors conclude that visceral adiposity, as inferred by measures of abdominal circumference, and sedentarism are key players for the development of insulin resistance. The topic is not new, since there are many studies on this topic, but authors stated in line 97 that few studies focused on adolescents that already developed insulin resistance as consequence of their weight status. This point has no references and should be expanded by the authors, in order to make clear what are the new informations provided by their study,

Major compulsory

a) Dietary habits were obtained using a 24-hours recall. In order to overcome the limitations of this approach when evaluating a chronic condition, in line 172 authors reported that a second questionnaire was distributed amongst a random subsample to calculate intra-individual variation. Neither the number of individuals or the results of this approach were presented. Without this piece of information, it is not possible to assess the reliability of the data of food intake, mainly in the context of the limitations of 24-hours recall to evaluated feeding habits. The usual instrument to evaluate food habits is the Food Frequency Questionnaire, as proposed by Willet in Nutritional Epidemiology, 3rd edition, chapter 5, page 74. Authors should expand the text in order to make clear the limitations of the employed approach;

b) Odds ratios were computed by univariate approaches and the multivariate model was based on linear regression. Was the dependent variable in the multivariate models a dichotmic variable? If so, the beta coefficient does not represent the probability of occurrence of IR after adjustment for the explanatory parameters. Perhaps authors should consider a polychotomic multivariate logistic model. Another point to be considered is the occurrence of non linear associations between IR and the independent variables.

c) Finally, authors should present a sensitivity analysis, to define how robust is their estimate of risk for developing IR to model specifications, considering the possibility of collinearity amongst the set of explanatory variables. Authors should explain with more detail the criteria to choose 3 variables from the entire set of
measured parameters

Minor points

In line 91, authors state that health personnel do not currently use WC in everyday practice. Is this assertion valid to Medellin, to the entire Colombia or is a global habit. A clarification, or a reference, should be included to justify the assertion.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

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

Declaration of competing interests: I don’t have any competing interests