Reviewer's report

Title: Fat-free mass prediction equations for bioelectric impedance analysis compared to dual energy X-ray absorptiometry in obese adolescents: a validation study

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Reviewer: Marina Ito

Reviewer's report:

This study aimed to validate the bioelectric impedance (BIA) prediction equations for fat-free mass (FFM) available in the literature for obese adolescents. DEXA was used as reference method. BIA predictive equation is population-specific, thus it needs to be validated according to the particular population’s characteristics, in this case obese and overweight adolescents.

Major Compulsory Revisions

1) Table 2 Most of the studies presented deals with populations of different age group than the studied one or non-obese. The information in the table should focus on equations of studies done on overweight or obese adolescents.

The author must respond to these before a decision on publication can be reached. For example, additional necessary experiments or controls, statistical mistakes, errors in interpretation.

2) (line 162) Why the predictive equations would be more accurate if the difference between boys and girls were the smallest? Please, explain.

3) (line 172) Why ten “overweight” subjects were excluded if in the method (line 93) it is stated that overweight and obesity were inclusion criteria?

4) Also, how the female and male subjects were distributed according to the age, considering that age and gender can influence FFM? Body composition may be different among adolescents according to their pubertal maturity; therefore, it is of interest to know how your sample (ranging from 11 to 18 years) was representative of these different age groups.

5) Overall, Gray’s equation was considered, among all, the most accurate (63% accuracy), although it underestimated FFM change in the follow-up. But, in the discussion, authors say “Gray’s equation showed minimal bias in boys, only”. This seems to be a relevant result, not a discussion. Would the accuracy of Gray's equation be different according to gender? Also, that study was done with an age group (19 to 74y) different than this, and may explain the relatively low accuracy of the equation. Authors should address this.

Discretionary Revision

6) Regarding the scope of the study, Lin Wang and coauthors have recently published a validation study for chinese children and adolescents. The data
analysis in that study may be a good reference to be considered (Wang et al., 2014). In that study, they also evaluated the estimation equation from 24 different studies and concluded similarly. Following that result, they, then, proposed an alternative equation, and demonstrated its validity.

7) In general, the result of the present study agrees with what is known from other studies. It would be most valuable if authors could have proposed an estimation equation specific for this group of subjects, and tested its validity.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.