Reviewer’s report

Title: Body Composition and Arsenic Metabolism in the Strong Heart Study

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Reviewer: Diane Gilbert-Diamond

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Body Composition and Arsenic Metabolism in the Strong Heart Study

In this study, the authors look at various measures of body composition and urinary arsenic metabolite percentages.

The following are all major compulsory revisions.

Major Comments: My greatest concern with this paper is regarding the % fat mass and % lean mass methods, results, and conclusions. It would also be helpful to know if participants were given any instructions on consumption of food and water, and exercise prior to the measurement, as hydration can greatly affect these measurements. What formula was used to calculate lean and fat mass? Is “lean mass” equivalent to “fat free mass”? Is there another component of body mass that isn’t represented by “% fat mass” and “% lean mass”? If not, then these are the only 2 components that would comprise a participant’s body mass and I presume that they should be strongly inversely correlated. Can the authors please comment on the -0.35 correlation and why it isn’t closer to -1. Also, if % lean mass and % fat mass are negatively related, can the authors please explain why it would make sense that their associations with % arsenic species are in the same direction? The discussion should be expanded to explain the different interpretations of the various body composition measures.

Minor Comments:

Abstract: Add “bioelectrical” before “impedance”

Introduction: Missing the Su et al paper from Taiwan that examines obesity and arsenic methylation.

Methods: Why didn’t the authors adjust for age as a continuous variable?

Results: For the statement, “The correlations between %lean mass and %iAs, %MMA and %DMA were confounded by sex, and in analyses…” Can you be sure? The analyses also adjusted for many other variables.

“Arsenic exposure in experimental models has been related…” Check this sentence for clarity.

“SAM results in homocysteine…” Check this sentence for grammar.

Discussion: “Information bias from measurement error and correlation... could
explain the findings of models that jointly adjust…” Please expand what the overall findings of this table are that can be explained.

Since this study examined various measures of body composition, I think that it would be helpful to have some text in the intro or discussion that explains why it is worthwhile to look at other measures besides BMI? Why might the measures have different associations? The authors briefly mention that BMI can be influenced by both fat and lean mass. My understanding is that BMI is a pretty strong indicator of adiposity for most Americans. There are issues with using BMI in populations that exercise heavily as they have high lean mass, and in elderly as they may have sarcopenia. I believe that this issue warrants further discussion. The authors also don’t explain why waist circumference is important.

Why don’t the authors interpret the differences in % arsenic species variability with BMI in the discussion?

Tables: Why doesn’t Table 3 include iAs?

Level of interest: An article of limited interest

Quality of written English: Acceptable

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

Declaration of competing interests:

I have no competing interests.