Reviewer’s report

Title: Body Composition, Water turnover and Physical activity among women in Narok County, Kenya

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Reviewer: Robert J Brychta

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Summary:
In this study the authors use doubly-labeled water to assess total body water turnover and body composition and accelerometers to study free-living physical activity in a population of Kenyan women from Narok County. The subgroups consist of urban (N=18) and rural (N=10) participants. The authors describe the body composition and physical activity for the research population as a whole and the two subgroups. Using regression analysis, the authors find that the water turnover is related to BMI, FMI, FFMI, and physical activity. Using multiple regression analysis, the authors find that physical activity contributes to water turnover independent of the BMI, FMI, and FFM using separate models for each body composition measure. The strengths of the study include the use of accelerometers for objective measurement of physical activity and doubly-labeled water for measurement of TBW in a population that has not previously been studied for these outcomes. The drawbacks of the study include a small sample population that may not be generalized to a typical population and an estimation of body composition using the DLW.

I commend the authors on undertaking a difficult field study such as this and the data collection appears to be well done given the circumstances. However, I have some concerns with the data analysis and presentation that must be addressed before this manuscript is suitable for publication.

Major Compulsory Revisions:
1. Environmental Temperature: The authors state a relatively wide range of temperatures that occur in the region where the study took place (9-30 C). I assume, and the authors also state, that environmental temperature could contribute the water turnover. The authors do not state how they controlled for environmental temperature. Was the data collected over 1 season with little variation in temperature? I think that the authors could look up the weather for the dates of the total body water monitoring for each participant and get the average temperature and use this as a control variable in the multiple linear regression models.

2. Accelerometer Wear-time: The authors do not explicitly state how wear-time was detected, although I assume they used the NHANES method stated in the Troiano paper. The authors should also use accelerometer wear-time as a
covariate in the multivariate regression models.

Minor Essential Revisions:
1. Throughout the paper, the author often does not define acronyms prior to using them. For instance, in the abstract, FMI is undefined. In the introduction, FFM, FM, FMI are undefined prior to use.

2. In the introduction and abstract, there is no mention of the aim (or sub-aim) to describe differences between rural and urban Kenyan women.

3. In the Methods, it is stated that 28 women participated in the doubly labeled water collection. It seems that there were only 22 women for the accelerometer portion of the study, but it is not stated why 6 of the women dropped out.

4. In the results, physical activity was statistically compared between the 2 groups, but none of the other body composition or demographic data was compared (no statement of significance), just reported. Was there a reason for this?

5. In the correlation results, was the relationship between water turnover and FMI, FFMI, and physical activity also positive? Is r a better statistic to use in this situation (rather than r2) because it can indicate the directionality of the relationship?

6. In the multiple regression results, I feel that the use of the phrase “on top of” is unusual in this situation and could be confusing. When I first read this section, it was unclear to me that whether this meant physical activity was divided by BMI or if physical activity was added to the model.

7. In the regression analysis, the relationship between water turnover and BMI had an r2=0.45, but on table 1, model 1 which has only BMI and a constant alone, the r2=0.38. I found that result confusing.

8. In the discussion, the author compares the physical activity of the current population to an unpublished data from a cohort of young Dutch adults. Why not compare with published NHANES data? I believe the Trioano paper cited elsewhere in the paper has similar data.

9. Several Tables are missing unit labels for some of the variables. Table 2, Fat Mass, Fat Free Mass, FMI, FFMI are all missing units. Table 3, Sedentary, Light, Moderate, Vigorous, Wear time should all have minutes as the unit.

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: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:

I declare that I have no competing interests