Reviewer’s report

Title: Feasibility of three wearable sensors for 24 hour monitoring in middle-aged women

Version: 4
Date: 8 October 2014

Reviewer: Sarah Kozey Keadle

Reviewer’s report:

This paper explores the feasibility of using 3 different activity monitors for assessing 24-hr periods among middle-aged women. Overall, the results are interesting and provide a fairly systematic overview of pros/cons of different monitoring protocols for future research.

Minor essential:

1. I agree there are not well-defined methods for estimating meaningful metrics from the ActiGraph on the wrist. However, the rationale for moving the ActiGraph monitor to the hip during the day is still unclear, particularly because the rationale is focused around the NHANES protocol, which does not switch back and forth. Have any other studies used this type of protocol? These results are limited to studies that would choose a similar protocol, and do not generalize to studies using a consistent wrist protocol for the ActiGraph. This should be clarified in the limitations section.

2. The previous literature also seems incomplete. Have any sleep studies looked at these feasibility issues and monitor placement? A recent review (Troiano et al., Evolution of accelerometer methods for physical activity research Br J Sports Med 2014) documents differences in compliance between hip and wrist protocols. They also cite other studies using wrist protocols, which may provide comparative data for wear time.

3. The writing quality could be improved. There are numerous typos/unclear and run-on sentences. There are some examples below, but these are not exhaustive and I suggest copyediting carefully and making the writing more concise where possible.

4. Line 1: state you mean moderate-to-vigorous physical activity (otherwise next sentence doesn’t make sense with light-intensity activity).

5. Line 4: Suggest changing the word additive- possibly to additional? some relationships could be multiplicative etc.

6. Line 20: change i.e., to e.g. and then remove “ect…” that sentence is also missing a parenthesis.

7. Line 51: missing a parenthesis
8. Line 64: missing were
9. Line 318: “similarly” seems out of place
10. 356- this sentence is unclear, what is “primary activity” referring to?
11. Line 358: This sentence is unclear. (in addition to measuring behaviors?) Elevated compliance compared to what?
12. Line 371: Add “these” to findings.
13. Table 2: inconsistent use of capitalization (e.g., Comfortable during Sleep)
14. In regards to behavioral feedback content- does that mean women felt it was provided, or felt it was accurate?
15. Figure 1: additional markers on the y-axis would be helpful- or numbers in the figure with each of the means and SD
16. References #25 and #26 have multiple numbers next to them.

Discretionary
1. Line 17-20: remove semi-colons
2. 351- change title to strengths and limitations
3. Line 53/throughout: the terminology for monitors is inconsistent- wearable sensors, behavior monitor, accelerometer, devices etc.
4. Methods 57-75: suggest reorganizing to provide an overview of study protocol in the first paragraph and moving details about the timing of appointment etc. to the second paragraph. When the 3 monitors are introduced it’s not clear if they’re worn at the same time or what the overall study design is.

**Level of interest:** An article whose findings are important to those with closely related research interests

**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