Reviewer's report

Title: Objectively determined physical activity levels of primary schoolchildren in south-west Germany

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Reviewer: Ursina Meyer

Reviewer's report:

General Comments:

The manuscript describes the level of children’s objectively measured physical activity, including differences between the physical activity levels during the weekdays, between boys and girls, and between overweight/obese children and their normal weight counterparts.

Due to the current importance of paediatric obesity and physical (in)activity, the article might be of interest for BMC Public Health. However, studies reporting children’s physical activity levels are excessively published and therefore it is important that the article clearly highlights what this study adds to the existing scientific knowledge. Thus, the introduction is very clearly and well written but could be better in revealing the void in literature. In the methods sections, a more precise description of the study sample and the used measurements would be helpful. The results section is clearly formulated and illustrated by several tables and figures. Some statements in the discussion should be documented more deeply.

Major compulsory revisions:

- Introduction: Page 4, Line 45+: Please highlight more precisely why your study is important and what will be the additive value of your study to the existing scientific knowledge.

- Methods: Study population: Please provide more information on how the study sample was chosen. It is well described that the current measurements were performed in a subsample of a larger program. However, there is some missing information: were the classes/schools of the main sample, but also of subsample randomly selected? How was decided which of the consented children are measured? If I understood correctly, not all of the consented children were measured. Please provide also information about the representativeness of your study sample. Were there any differences in characteristics between participating and non-participating children, or between children of the subsample and children of the main study?

- Methods: Physical activity measurement: It would be helpful if you provide more information on how the time in certain physical activity intensities was assessed.
Did the Actiheart software calculate these values? If yes, does the algorithm of the software use the equations of the validation studies you mentioned, or is it a different algorithm validated for children?

- Methods: Physical activity measurement: What does “Data was extrapolated for a full day” mean? Does this mean that you (linearly?) extrapolated the data to 24h if a child had less than 24h of activity data? How did you then account for sleeping time (i.e. if a child has worn the accelerometer only during waking hours where sedentary behaviour is much less than during the night)?

- Methods: Physical activity measurement: You mentioned that to be included into the analysis, at least 3 days (1 weekend day and 2 week days) were required. How did you handle the data if a child had less than 6 days of measurement? When extrapolating the available days, did you account for the 5:2 ratio for weekend and week days?

- Results: As mentioned above, it would be helpful if you could provide information on the representativeness of your sample.

- Results: You report an average of 135±61 min/day MVPA, which, according to the guidelines, is more than double the amount of time children should spend in MVPA per day. How is it possible that only 48% of the children met the 60 min of MVPA? How did you define if a child met the guidelines or not; was it based on the average amount of time spent in MVPA per week, or had every single day to be above 60 min MVPA?

- Results: Figure 1: please also add the information why children dropped off, and how you selected the participating children.

- Discussion: Regarding your finding that overweight children were more active than their normal weight counterparts; do your data support your hypothesis that the physical activity levels of overweight children could be higher due to a higher heart rates? For instance, did you test whether there were differences when looking at the accelerometer data only (without heart rate), or when looking at the total amount of physical activity counts rather than minutes spent in a certain intensity? Please set your results more in context of the existing literature.

- Discussion: Page 9, Line 170+: Is it surprising that children are less active during weekend days? There are several studies that have reported a similar picture. Please set your results in context of the existing literature.

Minor essential revisions

- Abstract, first sentence: the current recommendations are 60 min of moderate-and-vigorous physical activity per day. Please add the intensity of PA.

- Figures 2+3: Please indicate that the bars are means ± SD.

Discretionary revisions

- Keywords: Please change keywords since keywords should not appear in the title.
- Abstract: Purpose: think of adding the other aims (differences between boys and girls; differences between overweight/obese and normal weight children) to the study purpose.

- Introduction: Page 4; Line 34/35: The definition of MVPA might sometimes be confusing as certain researchers use “moderate-to-vigorous”, others use “moderate-and-vigorous”, or “moderate-vigorous” physical activity. In order to clarify, I would suggest that you change the sentence into “60 minutes per day in at least moderate physical activity (moderate to vigorous physical activity (MVPA))”.

- Methods: Statistical analysis: Please be clearer: Did you adjust the ANCOVA for BMI or for a binary variable (overweight/obese vs. normal weight)? Was grade (first grade vs. second grade) also included into the model?

- Methods: Statistical analysis: If the children were selected on the school level, it might be necessary to include school as a random factor into the model.

- Results: Please also report the compliance of the physical activity measurements. How many days was the accelerometer in average worn, and for how many hours? If there is a high variability between children, it might be necessary to adjust the model for the wearing time. Were there differences in the wearing time between boys and girls, first and fifth graders, or overweight/obese and normal weight children?

- Discussion: Page 8, line 158: You mention that sports club participation may be higher in second grade children. Are there any (German) data of the rate of first and second grade children participating in a sport club, maybe from the main study?

- Discussion: Do you have data of an idea of how long the children slept when they wore the accelerometer? Is the time spent in sedentary physical activity during weekend days less because children sleep more during the weekend?

**Level of interest:** An article of limited interest

**Quality of written English:** Not suitable for publication unless extensively edited

**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.