Reviewer’s report

Title: Education-related differences in physical performance after age 60: a cross-sectional study assessing variation by age, gender and occupation

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Reviewer: Bjørn Heine Strand

Reviewer’s report:

In the paper titled “Education-related differences in physical performance after age 60: a cross-sectional study assessing variation by age, gender and occupation”, based on Swedish data from the Swedish National Study on Aging and Care, the Kungsholmen population study (SNAC-K) it was reported better balance and walking speed among those with higher education compared to those with lower education. The association was less pronounced for grip and chair rises. The research question was well defined, the data and methods are sound and the manuscript is well written and easy to follow.

However, one major issue with the paper is that the interpretation of the results relies heavily on p-values. I miss formal tests of comparison between sub groups. For example it is stated that the educational difference in physical performance differed between age groups even if no formal test of this difference was performed and the younger group was twice as big as the older group. Similar issue applies to gender differences in educational associations (women twice as many), and other sub group analyses such as manual vs non-manual workers in women (see fig). Because of this size difference it is risky to base the conclusion on p-values without paying attention to the effect sizes (see for example in tab 3 for chair stands in model 2 adjusted for occupation: here the effect size is 20.6 for university in men and 18.0 in women and only in women it is significant). I also miss formal tests of these differences. This major weakness of the paper may lead the authors to reach false answer to their research questions, and thereby false conclusions.

Effect sixes is another issue. The authors use % differences in physical performance measurements between educational groups to report their effect sizes. I guess the rationale for doing this is to be able to compare effect sizes across different scales (grip=Newton, balance=seconds, etc). This approach relies heavily on the range of the scale. Another approach would be to use standardized values.

Table 1 might be more informative if it was age-adjusted. As it stands now it seems like those with university education have 1467% better balance score than elementary school peers [(47sec-3sec)/3sec]. Since age and gender differences are listed among the research questions I am curious to see table 1 stratified by gender and age group (<80 vs >=80) to see for myself if there are differences in the possible confounders between genders and age groups.
Furthermore, I miss the variable “chronic diseases” in table 1. A missing category for each variable would also be informative.

I wonder about the analytic sample in table 2. Is it indeed n=2211 <80 years in all models? Also in the fully adjusted model at the bottom? I suspect there are quite a few missing values in this model as I see from table 1 that each of the variable have missing values. The authors should ensure that it is the same people that are included in all the models. Same applies to table 3.

Table 3 is gender specific but it is stated at the bottom that it is adjusted for age and gender.

The figure lacks a y-scale label. Why is not chair stands shown in the figure? At the end of the results it is stated that sensitivity analyses were performed with imputed values, but it is not described how this imputation procedure was performed.

On page 4, last para at the bottom it is stated that few studies employed objective measurements of physical performance. This was in fact done in ref 4 i the paper.

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

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

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests.