Reviewer’s report

Title: Data collection costs in industrial environments for three biomechanical exposure assessment methods

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Reviewer: P. Paul F.M. Kuijer

Reviewer’s report:

With interest I have read the study ‘Data collection costs in industrial environments for three biomechanical exposure assessment methods’. This is the first time I read a paper on the cost involved in data collection regarding working postures. It is good to see that we as researchers are challenged by this paper to not only think in terms of getting valid, reliable and representative data but also how to do that in a cost efficient way. The study took as a business case the assessment of trunk and shoulder posture variables for 27 aircraft baggage handlers for 3 full shifts using self-reports via questionnaire, observation via video film, and full-shift inclinometer registration. Inclinometry was the most expensive method followed by observation and then self report (€ 36,865). The majority of costs (90%) were borne by researchers.

The following suggestions might be helpful for the researchers to improve the paper:

Major Compulsory Revisions

Background:
• page 3, is your ‘validity hierarchy’ still valid for biomechanical exposure methods when looking at the results of the following more recent papers:
• Page 3, Moreover, shouldn’t there at least also be a ‘reproducibility hierarchy’
• Page 5, ‘Study population’, shouldn’t that be a part of the methods section?
• Please provide clearly formulated research questions (which of course are answered in the conclusion).

Methods
• The Methods section was not clear to me. The paragraph starts with the
modeling costs. Based on the abstract I would have expected that the authors first would have explained the design of their prospective costs tracking study with information that is partly told on page 8 in the paragraph 'cost data collection', like

- How did the planned study design of the three methods of data collection (self-reports via questionnaire, observation via video film, and full-shift inclinometer registration) look like f.i. number of workers involved, number of researchers involved, activities performed, etcetera. For instance the ‘81 and 80 measurements’ mentioned on page 9 were not clear to me.

- Did the study designs for the three methods of data collection fulfill criteria like minimal required numbers (‘lean and mean’) for reliable, valid and representative data collection, so there was no overshoot in data collection that could explain the results regarding the cost differences in your study? Is this a point to address in the discussion?

- Whom registered the time that was spent on all the relevant outcome measures and calculated the costs involved for these measurements, were these persons trained or supervised, how reliable was their time tracking and cost calculation, and their categorization into the different categories for Eq. 1,

- How did you come up with Eq. 1? Eq 1. is described but no reference is given nor is described how you came up with this equation.

- In summary, please provide more insight in the design and data acquisition of Design 1 ‘Present study’. Next, explain in more detail the rationale and content of the other five scenarios and how you calculate these based on the collected data concerning the planned study for the three methods of data collection: self-reports via questionnaire, observation via video film, and full-shift inclinometer registration.

- Is table 1 the planned design or the results after the measurements were performed? Then, in my opinion, it should be in the results section. Please take the reader by the hand, how you came up with the different numbers in the table.

Results

- Just like the method section, I expected at least also the following types of information:

  - Was the actual design for the three methods of collection performed exactly as was planned or were their alterations?

  - What data was collected regarding the time that was spent on all the relevant outcome measures and the costs involved for the three methods: self-reports via questionnaire, observation via video film, and full-shift inclinometer registration. Were their differences between researchers regarding reported data?

  - Please provide more explanation in the text regarding the tables 2, 3 and 4. In my opinion, parts mentioned in the discussion section in paragraph ‘The effect of study design and cost assumption’ should be in the results.

Discussion:
• I liked the discussion: relevant topics were addressed!
• Page 21, are the costs for capital investments and energy not already calculated in the overhead of 68% (page 6)?
• Shouldn’t there be a remark regarding the costs of at least differences in data processing for these three measurement methods and the possible consequences for the conclusion?
• For discussion: It is my experience that stakeholders appreciate data retrieved from observations and inclinometers more that of self-reports and consequently may be more willing to act on these type of data. So sometimes an ‘overshoot in measurement effort’ is necessary to convince stakeholders. What is your experience?

Minor Essential Revisions:

Title
• Is ‘posture’ instead of ‘biomechanical’ a better phrasing? No biomechanical outcome measures like forces or moments were calculated.

Abstract:
• Clearly written and concise, well done!
• Again, is ‘posture’ instead of ‘biomechanical’ a better phrasing?

Paper
• Page 3, delete space _ before '_Much of the cost-efficiency'
• Page 6, delete space _ after ‘(CR_)’
• Page 10, ‘… differ differing from…’, delete differing
• Page 14, table 5, please check the spaces _ and Capitals in the column entitled Scenario
• Page 15, ‘tale 5 and 6’, should be ‘table 5 and 6’
• Tables, the first row of the tables had missing text in a number of cells

Hopefully my comments are of use for the authors.

**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.