Reviewer's report

Title: Computer-induced health complaints and sources of ergonomic instructions in computer-related issues among Finnish adolescents: A cross-sectional study

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Reviewer: Nathaniel Hupert

Reviewer's report:

General Comments:

This paper has the potential to be a useful contribution to the literature both on computer-associated musculoskeletal complaints and on ergonomic education for younger students. Its main strength is the rich nationally-representative database on which it is based. However, it is marked by two important flaws: a too-loose use of the concept of causality; and poor citation and discussion of relevant published studies. This review will cover both of these points in detail.

It seems to me that the most important conclusion of the paper has little to do with causal attribution or regression models, but is the following statement: (p. 14)

Our findings indicate that a remarkable proportion of adolescents are not aware of computer-related ergonomic instructions...

Major Compulsory Revisions

pp. 1-4, p.6

Causality vs. association:

In the view of this reviewer who has published in this field, the authors need to be far more careful in assigning causal relationships to the association of symptoms and exposures with regard to injury and computer use. They state p. 3, for example, "Results have confirmed that computer use induces pain and discomfort not only in the neck shoulder or back regions [8, 9, 10, 11, 12] but also in the hands, fingers or wrists [8, 10, 11, 12, 13] and eyes [8, 10]." But are all of these references actually strong enough to support this statement? 8 is a pilot study, the title of 9 is "The association between childrens' computer use and...", 10 as well uses the term "associated with" in its title, etc. They are not prospective, longitudinal, controlled studies, and to cite them in this way is not consistent with their own conclusions about the degree or necessarily even the direction of causal linkage between computer use and injury.

This problem recurs throughout the manuscript. In the concluding sentence on p. 4 the authors use the term "risk" when the proper term should be prevalence: "The primary aim of this study ... and secondly whether receiving instructions was
associated with a reduced risk of computer-induced health complaints.” Perhaps it seems a small point, but the distinction between risk arising from computer use and the increased odds of something occurring in association with that use is, I believe, important.

Of even greater importance, however, is the appearance of bias in the very questionnaire used in the study. One of the questions is: “Using a computer may cause health complaints (pains, aches, discomforts). Have you experienced these complaints when using a computer?” The first statement unfortunately biases any potential response to the second. Later, students are asked, “Were you ever instructed or did you instruct yourself how to avoid these health complaints?” when the term “issues”, or some other more neutral word might have been better advised. In light of this, it is somewhat disingenuous of the authors to state on page 17, in the limitations, ”This study was cross-sectional and causal inference on the relationship between computer time and computer-induced symptoms cannot be drawn from this study, although Finnish children commonly attributed these symptoms to computer use.” Clearly, the questions these students were asked did the attribution for them! How the authors resolve this issue will go a long way to giving them new perspective on the extensive and risky use of causal language throughout the manuscript.

p. 2 Appropriateness of references:

The authors should perform another literature search to buttress their citations, since they are curiously selective and in some cases inappropriate for the particular study population at hand. For example, in a report on younger students they cite a paper on graduate students (SCHLOSSBERG, E.B., MORROW, S., LLOSA, A.E., MAMARY, E., DIETRICH, P., REMPEL, D.M. Upper extremity pain and computer use among engineering graduate students. American Journal of Industrial Medicine 2004, 46, 297-303) but leave out the following 5 studies of undergraduates, closer to their study sample's age range:

1:
Undergraduate college students' upper extremity symptoms and functional limitations related to computer use: a replication study.
Jenkins M, Menéndez CC, Amick BC 3rd, Tullar J, Hupert N, Robertson MM, Katz JN.
PMID: 17429149

2:
Direct observation of computer workplace risk factors of college students.
PMID: 17264422
Upper extremity musculoskeletal symptoms and functional impairment associated with computer use among college students.
Hupert N, Amick BC, Fossel AH, Coley CM, Robertson MM, Katz JN.
PMID: 15502288
[Note: This reviewer is the first author of this study]

Effects of a participatory ergonomics intervention computer workshop for university students: a pilot intervention to prevent disability in tomorrow's workers.
Robertson MM, Amick BC 3rd, Hupert N, Pellerin-Dionne M, Cha E, Katz JN.
PMID: 12441571

Assessment of upper extremity role functioning in students.
Katz JN, Amick BC 3rd, Hupert N, Cortes MC, Fossel AH, Robertson M, Coley CM.
PMID: 11757052

This reviewer would like more detailed comparison with refs 8 and 10 and the above refs as well.

It would be interesting to see the intermediate results of the second regression, since the inclusion of computing time as a confounder is of interest but not necessary.

Language:
The manuscript is not carefully written for an English-language audience. Here is a passage in the original and as it might be re-written to make clear the meaning and intent of the authors:

"Use of computers as well as musculoskeletal symptoms have increased among adolescents. There is evidence that musculoskeletal symptoms can be reduced by
ergonomics approach and education. The purpose in this study was to examine where adolescents had received ergonomic instructions related to computer use, and whether receiving instructions was associated with a reduced risk of computer-induced health complaints."(p.1)

[New]"[The u]se of computers as well as musculoskeletal symptoms have increased among adolescents. There is evidence that musculoskeletal symptoms can be reduced by [an] ergonomics approach and education. The purpose [of] this study was to [determine in what setting] adolescents had received ergonomic instructions related to computer use, and whether receiving instructions was associated with a reduced risk of computer-[associated] health complaints."

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

**Quality of written English:** Needs some language corrections before being published

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

**Declaration of competing interests:**

As noted, I worked with researchers at Harvard and Rice on these topics and published a number of articles, one first authored. I do not currently work in this field and have no grant funding or other financial stake in it. Therefore, I declare that I have no competing interests.