Reviewer's report

Title: Perceived stress and musculoskeletal pain are prevalent and strongly associated in adolescents. An epidemiological cross-sectional study.

Version: 2
Date: 17 August 2015
Reviewer: Emelie Condén

Reviewer's report:

Thank you for giving me the opportunity to read this interesting and eager manuscript. It is of interest in its field. This article highlights the associations between stress and musculoskeletal pain among adolescents in a cross-sectional school study.

• Major Compulsory Revisions

1. In general, I think that the paper is too lengthy and would benefit from being shortened, especially the introduction section. This will increase the readability of the paper.

2. Due to the fact that the design of this study is cross-sectional, the predictive values described are questionable. Due to the lack of possibilities to determine causal direction among the studied variables, I would prefer that you replace the word predictive with associations or odds through the manuscript.

3. I seek for a discussion regarding the use of VAS-scale in the statistical analyses. The correct use of the VAS-scale is to use it as an ordinal scale.

4. Be consistent when describing pain, sometimes its named musculoskeletal pain, and more often just pain.

5. Missing data: Information regarding those pupils that were absent from school the day of the data collection is missing. Questionnaire studies on school populations may miss those students with the most musculoskeletal pain or stress due to their absence from school on the day of the questionnaire. A missing case analysis is merged.

6. There are some difficulties to understand how the variables in the GLM were modified. Was it a summations index or something else?

7. In the GLM analysis, other confounders, more than gender and BMI are missing, for example sleep, smoking, family socio-economic status, mobile use and exercise, and that may affect both the pain and the stress.

8. Stress is more common and more often reported among girls. Girls are more prone to express their stress in internalizing symptoms such as musculoskeletal pain. A descriptive presentation of possible difference between the prevalence of stress between boys and girls and possible differences of musculoskeletal pain between boys and girls is urged. Even if you have used gender as a confounding factor, a split of the analyses and the results depending on sex is a necessary condition. It is possible that the R2 will increase when analyzing boys and girls
separate related to the variance due to differences in the variance of stress. A discussion is needed to clarify the differences in etiology on stress between boys and girls.

• Minor Essential Revisions

9. In the abstract, please rephrase high correlations in line 43, \( r=0.40 \), \( r=0.4 \) is more of an moderate correlation
10. Line 75, please check the grammar.
11. Line 168, has the PSQ been validated in a Norwegian context, more than the translation and back translation?
12. In the text between line 237-238, please describe the power of the correlations, it seems as if some of them, for example worries and pain sites and duration, are weak and some, for example worries and PSQ and auto correlated. Total PSQ are in general weak correlated to pain sites, pain duration and pain intensity. The p-value only informs us that the weak correlation occurs not by chance.
13. In the questionnaire, did the adolescents report the intensity of the pain for each category, or in general?
14. In line 226,...... and most of them reported long-term pain (table 1).... there are some vagueness regarding that. Did 51.5% of the adolescents reported pain and of whom 36.2% reported long-term pain, in that case, it’s not the most of them.
15. Table 2. The intensity of the pain were quite low 2.2 (SD 2.8), was that the over-all pain or did those reported no pain in the dichotomous variable also reported their pain on the VAS-scale? In the logistic regression analysis, how were the dichotomous variables created?
16. Line 360, the findings in this present study suggest that the risk for disability.........Disability has not been measured in the present study
17. The correlations reported in table 4 are, in general weak, the models explain only a small proportion of the variance of their dependent variable. Authors should discuss this and they should try to explain what the weak associations may in this context.
18. Table 8 presents quite small effect size, please discuss the results in regards to the low means of pain intensity (2.2 SD (2.8)).

• Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)

19. Discussion should focus more on the actual results, interpreting the findings as opposed to largely speculative consideration of potential mechanisms.
20. Can Table 5, 6 and Table 7 bee rearranged and merged into one table instead?
21. It would be of interest to do an interaction model in the GLM of the covariates in the PSQ questionnaire in order to get a deeper understanding of the variance in the covariates.
Level of interest: An article of importance in its field

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

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:
'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.