Author's response to reviews

Title: A single item stress measure as a predictor of severe injury: a prospective cohort study of 16,385 forest industry employees

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Author's response to reviews: see over
Dear Editor,

We were pleased to learn that you encouraged us to submit a revised version of our manuscript (MS 1973882951029258). We feel that the editorial comments and the comments that were provided by the two reviewers dealt with important issues, leading us to revise the manuscript in accordance with those comments.

Please see below for a point-by-point response to concerns raised by the reviewers. We have highlighted all new text in the revised manuscript. We hope that our response adequately addresses all the concerns raised.

We look forward to hearing from you.

Sincerely,
The Authors

Editorial comments:

The editor asked us to give an indication of how long the effect lasts. “The proportional hazards assumption was tested using the method of Lin and Wei, in which the observed score process is compared with the simulated score process for each covariate. The p-value was obtained by performing a Kolmogorov-type supreme test. We performed 1000 simulation for these tests, and the maximum absolute value for intermediate stress was 1.38 and for high stress 0.74. Because all p-values were >0.05, we can assume that the hazard was stable throughout the follow-up.” (Page 7, lines 161-164.)

Reviewer 1

1. The flow diagram depicting the number of potentially eligible participants, the number of eligible participants, the number of participants who completed the questionnaire, and the number of participants who were excluded due to missing data or previous injury is now presented in a new Figure 1.

2. The reviewer is correct that in the present study we examined the relationship between stress and injury adjusting for known confounders. We have now corrected the terminology and do not use the term predictor anywhere in the text. We are also happy to amend the title if requested.

3. A comparison of the demographic characteristics of the final analytic sample and the missing population is now presented at the end of first paragraph of the results section:

   ”The final study population included a higher proportion of women (23% versus 21%, p<0.001), white-collar workers (34% versus 27%, p<0.001), employees aged <50 years (66% versus 52%, p<0.0001), and those who were married (66% versus 61%, p<0.0001) than the missing or otherwise excluded population.” (Page 8, lines 177-181)

4. Based on the reviewer’s helpful comment, we have amended the description of the results presented in Table 4 and now write as follows:

   ”Table 4 shows that the employees who experienced high stress at both measurement points with a four year interval had more than a 1.7 fold risk of severe injury during the follow-up (HR 1.74; 95% CI 1.01-2.99, in Model 2). This result attenuated slightly and became non-significant when
Following this important point made by the Reviewer, we have re-written Discussion and amended Abstract accordingly, focusing on the results presented in Table 2. Please see the revised Abstract and pages 10-11.

Revised sections in the Abstract:

"Results: Highly stressed participants were approximately 40% more likely to be hospitalised due to injury over the follow-up period than participants with low stress. This association remained significant after adjustment for age, gender, marital status, occupational status, educational level, and physical work environment.

Conclusions: High stress is associated with an increased risk of severe injury."

The Discussion section:

"Thus we can conclude that high stress is a risk factor hospitalised injuries." (Page 10, lines 220-221)

"On the basis of stress theories and meta-analyses [17] we expected that long-lasting stress will have an adverse impact of employees’ well-being and increase the risk of injury. Some of our models suggested an elevated risk of injury among those who had reported stress at two measurement points but generally speaking there was no clear significant association between repeated exposure to stress and risk of serious injury. Although the hazard ratios were rather large the wide confidence intervals and lack of statistical significance mean that these results are likely subject to type 2 error. However, it is possible that the fact that there were only a small number of injury cases (n=14) among those who reported high stress at both measurement points has increased the confidence intervals and produced non-significant results. Additional studies are therefore needed to examine the role of chronic stress in elevating the risk of severe injuries in different populations." (Pages 10-11, lines 239-248)

6. We have moved the description of the demographic characteristics of the cohort from the Methods section to the start of the Results section.

7. “We merged the first and the second, and the fourth and the fifth category as the numbers of participants in categories 1 and 5 were very small”. (Page 5, lines 110-11).

8. The two-year period for exclusion of injury cases is based on the assumption that an older injury, that is, an injury experienced more than 2 years ago, would not anymore affect the new injury risk “…this exclusion was based on the assumption that an injury experienced earlier than this would not anymore affect the new injury risk”. (Page 6, lines 118-119).

10. The reviewer queried about the reasons for including these particular confounders. These confounders were selected because they have been associated with injury risk in earlier studies as references 8 (Salminen) and 9 (Cheung) showed. This point has now been added to methods section (page 7, lines 145-146). In addition, the identical set of confounders has now been adjusted for in all analyses (tables).
12. The fact that the number of injuries among those who reported high stress at two measurement points was very low has now been noted in Discussion:

"However, it is possible that the fact that there were only a small number of injury cases (n=14) among those who reported high stress at both measurement points has increased the confidence intervals and produced non-significant results." (Page 11, lines 245-247)

13. See our earlier Response #1.

14. The reviewer suggested to present the results by injury type. Unfortunately our data did not allow that.

15. The reviewer asked us to present the strengths of the study. We have now added these to the same paragraph as limitations and consequently changed title of this section to “Strengths and limitations”. This section now reads as follows:

"Previous studies reviewed suffered from common method bias because both stress and safety outcomes were self-reported. The major strength of this study is its prospective design and a long register-based follow-up period, up to 22 years. The outcome used in the study, injury diagnosis derived from a hospital discharge register, covers all hospital admissions in Finland, and gives an objective clinical endpoint with concrete consequences. The data on severe injuries were complete and the use of independent national register data for exclusion, adjustment, and assessment of the outcome helped us to avoid common method bias. However, our measure may be confounded by factors that influence whether or not the person seeks treatment for the injury. Our findings may provide conservative estimates, because some clinical injuries may go untreated and their effects tend to become diluted during a long follow-up period. In addition, in the final sample, male, younger, and non-manual workers were somewhat overrepresented compared to those excluded.” (Pages 11-12, lines 260-270)

Reviewer 2:

1. We have now spelled out the acronym HR and specified that the number of cases refers to the number of injury events in Table 1. In addition, based on the reviewer’s comment, the values in Table 1 were checked. HR values for age (1.03) and gender (1.68) and their CIs were corrected, but the p-value for age was correct (0.63).

2. “Using data from the Still Working cohort, Ahola and her co-workers [18] showed that occupational burnout increased the risk of injury. It is not surprising that our results are in line with that study, because burnout is a chronic work-related stress syndrome. However, we used a larger dataset and had a longer follow-up period, and we measured stress in general rather than just work-related stress. Taken together, it seems that both severe work-related stress and general non-specific stress can lead to an increased risk of severe injuries that require hospital treatment.” (page 11, lines 251-256)