Author's response to reviews

Title: What are the effects of having an illness or injury whilst deployed on post deployment mental health? A population based record linkage study of UK Army personnel who have served in Iraq or Afghanistan.

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Author’s response to reviews: see over
Dear Catherine Olino,

Thanks again for considering our paper for publication in BMC Psychiatry.

Please find below the reviewers comments and our responses.

1st Reviewer: Alexander McFarlane

Firstly, having a physical illness appears to be a proxy marker for age. From the description it is not clear how this potential confound was dealt with in subsequent analyses.

We agree that physical illnesses were more likely to occur among older individuals, therefore age was adjusted for in all analyses (please see the footnotes on all tables full a full list of which variables were included in the adjusted analyses and the section entitled “Statistical analysis” (page 6) for full details of our analytical strategy).

Furthermore, both those who had injuries and illness were associated with an increasing number of traumatic deployment experiences. Again the possible confound exists that injury and illness are proxy markers for the number of traumatic experiences. Whilst there is a logic to why to those who suffer from physical injuries may have had more traumatic experiences, this finding is an unexpected one in relation to illnesses. Hence, whilst reported this finding should not be left without further exploration because of the potential for mis-attributing outcomes to illness rather than the number of traumatic experiences.

We agree and we have adjusted for traumatic deployment experience in all analyses (please see table footnotes).

One possibility for example, is that the illnesses experienced whilst on deployment may have been psychosomatic manifestations of the stress response.

The authors acknowledge that this is a potential explanation however we believe it is unlikely to account for all the association we’ve observed in this study. Furthermore, if a physician believes an illness to be a psychosomatic manifestation of the stress response, it may have been recorded as a psychiatric illness on OpEDAR.

The interpretation in the text related to the issue of social support. Given the potential confounds in the manuscript apparent in the reporting of the data, this association or exploration is not supported.

The issue of social support is only suggested as a possible explanation of our findings. We have, however, subsequently looked at marital status, as this is a major component of social support. Table 3 and 4 are now adjusted for marital status along with other confounders. This did not affect our findings. Unfortunately, our data does not allow any further exploration of social support.

Given that the records are available, some exploration of the nature of the physical illnesses suffered on deployment and the required evacuation should be reported as primary data.

Very basic and broad categories were used to classify disease, therefore, we believe it is not appropriate or meaningful to present results by “cause”. We have looked further at the classifications given to illnesses that required medical evacuation; they make up a broad range of causes, with no single cause dominating. Whilst understanding the nature of the illnesses would be beneficial, the quality of these data makes it difficult.

Another potential confound is the issue of those who suffered head injuries or concussion whilst on deployment. Given that the number reporting head injuries in the KCMHR study is small [the estimated prevalence among Iraq/Afghanistan deployed personnel being 4.4% (see Rona et al. (2012) Mild Traumatic Brain Injury in UK Military Personnel Returning from Afghanistan and Iraq: }
Cohort and Cross-sectional analyses, J Head Trauma Rehabil, Vol 27(1) p33-44] the authors did not think this was appropriate.

Finally, there is a broader literature about disasters and the impact of injury on mental health outcomes in contrast to other exposures. Some reference to that general literature would be a further valuable contribution to this paper. The findings of this study have relevance above and beyond the post-deployment literature.

We have included studies exploring PTSD following injury in the general population: (Helzer, Robins et al. 1987; Blanchard, Hickling et al. 1995), 2nd paragraph of the introduction.

2nd Reviewer: Lyndon Riviere

Major compulsory revisions:
1. One of the main independent variables was illness (sometimes referred to as physical illness). However, there was a lack of clarity whether the illnesses were solely physical or both physical and psychiatric.

We agree this is unclear in the text. Illnesses can be either physical or psychiatric. This has been clarified [please see page 5, paragraph entitled “Classifying events on OpEDAR”, which now reads ”Each event was classified as an injury or an illness (including both physical and psychiatric illnesses)”). Subsequently, illness is no longer referred to as “physical illness”.

In the description of the OpEDAR data, which is the main record of emergency room visits, it is noted that “data were provided on data and location of attendance, diagnosis, cause (hostile or nonhostile), classification (e.g. psychiatric, musculoskeletal, respiratory)…” If emergency room visits for psychiatric reasons were included, the authors should either not use the term “physical illness” or distinguish between psychiatric illnesses and physical ones in the analyses. It is possible that the psychiatric illness constitute too small a proportion of all illnesses for separate analyses. In such a case, the authors should state what percentage of the 505 OpEDAR events were psychiatric ones. If is not possible to disentangle physical illnesses from psychiatric ones that should be noted as a limitation. It is important to clarify this because it is highly likely that soldiers who present to an in-theatre emergency room with psychiatric illnesses will have post-deployment mental health problems.

The number of patients with a classified “psychiatric” illness was small (n=7). We have included sensitivity analyses dropping psychiatric illness events. The results were unaffected (please see table B3 in the Appendix).

We have reported this in the methods section (please see page 7) and in the results section [please see page 9, paragraph entitled “sensitivity analyses”, which now reads “When the sensitivity analysis excluding psychiatric cases (n=7) was run, there were no notable differences in the results [data not shown; see additional file]."

2. The authors indicated in the last sentence of the study design section that “deployment specific factors could then be controlled for”, and the logistic regression analyses were adjusted for traumatic deployment experiences. However, no adjustments were made for in-theatre mental health problems. Unfortunately, we do not have data reporting in-theatre mental health problems for this cohort. However we do know from three in theatre data collections, between 2009-2011, that the mental health status of deployed troops is broadly similar to that at post deployment where the cohort data arises from (Mulligan, Jones et al. 2010).

Further, as part of their sensitivity analyses, the authors analyzed whether adjusting for having an OpEDAR event prior to the most recent deployment altered the main study findings. However, they do not indicate whether they had (or did not have) any measures of mental health from prior deployments. Prior mental health problems/symptoms are confounders and the authors should address why they were not included in the analyses.

Prior mental health problems were not collected during the phase 2 questionnaires. However, 2722 participants completed a phase 1 questionnaire. In total, 381/2722 participants had an OpEDAR event and 131/381 had this event after their phase 1 questionnaire. Therefore, we were able to conduct a sensitivity analyses adjusting for phase
1 mental health, among these 131 participants and other participants completing phase 1 and 2 with no incidents. Please see table B4 in the appendix for the results.

This sensitivity analyses has been noted in the methods on page 7, which reads "Finally, although previous history of mental health was not recorded at phase 2, some participants completed a phase 1 questionnaire, where mental health indicators were recorded. A sensitivity analysis was carried out adjusting for mental health status at phase 1, among personnel who completed both phase 1 and phase 2 and had either an OpEDAR event after phase 1 or no events. Personnel with phase 1 mental health problems were all those defined as a PTSD or common mental disorder case."

The results section on page 9 provides the results of this analyses; "The final sensitivity analysis included participants with mental health information from phase 1 (n=2472); there were no major differences in the results [data not shown; see additional file]."

3. According to the section “classifying events on OpEDAR”, there were 108 individuals who had multiple events. The authors provide details on how the most severe event was selected for the analyses and ran a sensitivity analysis on whether adjusting for illness taking precedence over injury affected the main results. However, it was not reported whether individuals with multiple events had worse mental health than those with single events.
The prevalence of mental health conditions did not differ significantly between the patients with single and multiple OpEDAR events. A note has been made in the text (see page 6, which reads "The prevalence of mental health conditions did not differ significantly between those with single or multiple events [data not shown].").

Further, no information was provided on the proportion of the 108 individuals with multiple events who had both illness and injury events. It is understandable that the authors cannot include every analysis in the manuscript, but they should at least note to readers that the associations between illness or injury with mental health problems could have been affected by their choice of the most severe event.
This has been noted in the text (see p11, which reads, "although a sensitivity analysis was run where illness took precedence over injury, it is acknowledged that the associations found here may be affected by the choice of the most severe event").

Discretionary Revisions:
1. The authors did not find an association between having an OpEDAR event and alcohol misuse, which may be likely due to similar percentages of those with no event (17.5%) reporting alcohol misuse to those with an event who misused alcohol (18.9%). In the discussion section they discuss the lack of an association between injury and alcohol misuse, but do not mention the lack of association with illness.
The lack of association with illness has been mentioned (see page 10, “This study also found that attending an emergency department for any reason, including a hostile injury, was not associated with an increased risk of alcohol misuse among UK Army personnel.”)

We look forward to hearing from you.

Yours sincerely,

Harriet Forbes and Nicola Fear