Reviewer's report

Title: Physical activity is associated with a low prevalence of musculoskeletal disorders in the Royal Norwegian Navy: a cross sectional study

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Reviewer: Karin I Proper

Reviewer's report:

General
The paper deals with a very interesting topic that has not yet been studied well. From that point of view, the manuscript is both relevant and original. Indeed, studies as to the relationship between physical activity (in several domains: eg., both at work and in leisure time) and MSD are needed and the current study might contribute to this. However, I have some major and minor comments on the methodology of this study, which I will mention below.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

One of the aims was to determine the prevalence of self-reported MSD. However, to do so, you need a representative sample of the target population of concern. I doubt whether this is the case, as 1) hardly any information is written about the recruitment and the representativeness of the study population, and 2) there is low initial response rate (58%).

My second main concern involves the measurements and definitions used, especially those of physical activity. The questions that arise are among others:
- What is the reference of the physical activity questionnaire used?
- Has this questionnaire been tested for reliability and validity?
- As the public health physical activity recommendations includes only those activities that are of at least moderate intensity, I don't understand why the authors have included light intensity activity? (as not health-related effect is assumed of light activities, or is it??)
- As to the analyses, I don't understand why they have combined the physical activity measures. That is, I would suggest to re-do the analyses and present the associations of the physical activity measures separately (1. vigorous PA at work, 2. vigorous PA in leisure time, 3. light/moderate (?) activity at work, and 4. ) light/moderate (?) activity in leisure time) with MSD. This will provide much more information in the relationships of concern, and will be of higher relevance for both scientists and practitioners.

Furthermore, I need some more information about the rationale for the study, and for choosing the study population in particular. In my opinion, the study population includes a very specific group. Moreover, the study population includes two groups (as the authors indeed do), namely civilians and military personnel. However, these two groups are rather different in their work-related (physical) activities, and thereby probably also in their leisure time activities. Also, due to their physical activity training, military persons may be at higher risk to develop (sports) injuries, which is different from MSD!

The authors do not describe this issue, neither discuss the implications for the analyses, the results (ie., the interpretation of the results). In this context, separate analyses of the physical activity measures (see above) are of great value!

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Introduction.
- Especially in the beginning of the introduction, the authors mention a lot of positions, which, in my opinion, are to brief and needs some more explanation (description of the rationales).
- Please give a definition of MSD to be used. Does this include injuries as well? If so, I have serious doubts about doing so, because these are different constructs, and have different causes. In the current version of the manuscript, the authors are not consistent in using these terms.
- Page 2, line 7. Studies of physical activity… what kind of studies? As far as I understood, I can not agree
with this, as there are several studies that have investigated physical activity at work. Please, explain.
- Page 2: ref#9. Please add at least another reference, i.e., Pate et al., 1995
- Page 3. first paragraph. The authors mention that some studies have been performed, but do not mention the conclusions! It is of more relevance to describe the results of those studies, as that should be the reason for performing the current study.

Methods.
- Page 4. Give a more detailed description of the recruitment of the study population.
- Page 4, Measurement of MSD. If MSD is the main outcome measure, why did the authors assess the prevalence only, and not the intensity, severity, or the duration of the complaints? Further, MSD in the head? What sort of disorders are these?
- Page 5, Other variables. I think the smoking and BMI variable can be categorized onto two and three categories respectively (smoker vs non-smoker and BMI <25, 25-29.9 and ≥30).
- Page 6. I have serious problems with the physical activity scale produced (see above). In doing so, you lose a lot of relevant information. I strongly suggest to perform separate analyses, in order to be able to draw a conclusion about the association between each physical activity measure and MSD.

Results.
- Page 7. Why did the authors perform a test to determine the (significant) differences in characteristics between the military personnel and civilians (as the main analyses has been performed separately)?
- Page 9. Have the regression analyses been adjusted for all other variables (i.e., including physical activity)? As far as I understood, they didn't, but I would certainly suggest to do so.

Discretionary Revisions (which the author can choose to ignore)

What next?: Accept after minor essential revisions
Level of interest: An article of importance in its field
Quality of written English: Acceptable
Statistical review: No
Declaration of competing interests:
I declare that I have no competing interests