Author’s response to reviews

Title: Associations of Sleep Quality and Sleep Duration with Frailty and Pre-frailty in an Elderly Population Rugao Longevity and Ageing Study

Authors:

Xue-Hui Sun (1785254436@qq.com)

Teng Ma (mt152630@163.com)

Shun Yao (14210700119@fudan.edu.cn)

Ze-Kun Chen (chenmitaoi@163.com)

Wen-Dong Xu (perterlab@163.com)

Xiao-Yan Jiang (xiaoyanjiang001@163.com)

Xiao-Feng Wang (xiaofengwang71@163.com; wangxiaofeng@fudan.edu.cn)

Version: 2 Date: 08 Dec 2019

Author’s response to reviews:

Dec 7, 2019

BMC Geriatrics

Submission ID:
RE: BGTC-D-19-00246R1

Dear Editor,

We would like to thank the reviewers for the comments and suggestions which offered an opportunity for a further improvement of our manuscript.

Following the suggestions of the reviewers, we revised the manuscript. Enclosed please find a point-to-point response to the reviewers’ comments attached to this letter. Hope you and the reviewer find our response satisfactory.

If you have any further questions, please do not hesitate to contact me.

Sincerely yours,
Response to Reviewer’s comments

Reviewer reports:

Sean Martin (Reviewer 1):

Comments: The authors provide a cross-sectional analysis from a large, prospective cohort of elderly Chinese women & men examining the influence of self-reported sleep parameters on the risk of frailty (and pre-frailty), after appropriate adjustment for potential confounders. This is an area of interest that has only received moderate attention, and subsequently this analysis would be a welcome contribution if a number of issues were addressed. Namely:

- The discussion of previous analyses on the association between sleep and frailty needs further work. While the authors address a few of the major studies (and would obviously not be expected to address all previous research), there does seem a number of omissions whose inclusion in the introduction or discussion would better contextualise where this analysis sits and better inform the reader of the state of evidence between sleep and frailty (e.g. PMIDs: 30379304; 30270714; 30569070; 26832127).

Response: Thank you very much for the constructive advice. According to your advice, we have added the following articles in our revised manuscript: PMIDs 30379304; 30270714; 30569070; 26832127.

Comments: On a related point, the authors claim this analysis is the first study to examine the effect of sleep on pre-frailty, but there appears at least one other study (Morgan K, Hartescu I. Sleep Med. 2019 Feb;54:231-237). They should further check the veracity of this claim.

Response: Thank you very much for the constructive advice. Accordingly, we read the paper “Morgan K, Hartescu I. Sleep duration and all-cause mortality: links to physical activity and prefrailty in a 27-year follow up of older adults in the UK. Sleep Med. 2019; 54:231-237.” Yes.
This study found that “long (≥9 h) sleepers are characterized by low levels of daily exercise, low muscle strength, and very slow walking speeds (all indicative of prefrailty/frailty)”. According to your advice we discussed their results in the discussion section of our revised manuscript.

Comments: The C-PSQI appears relatively well-validated in a patient sample with primary insomnia (PMID 16155782). What evidence is there that this item is applicable to an otherwise healthy cohort. Should other cut-points be considered?

Response: Yes. You propose a very meaningful question. It’s a pity that we could not found the validation study of C-PSQI in a healthy cohort. In the study of PMID 16155782, the C-PSQI cut-point of 6 also seems acceptable (sensitivity and specificity of 90% and 67%). We then used this cut-point to perform sensitivity analysis and found similar results as the cut-point of 5 which was shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th>p</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-frail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX</td>
<td>&lt;0.001</td>
<td>1.89(1.51-2.37)</td>
</tr>
<tr>
<td>Model1</td>
<td>&lt;0.001</td>
<td>1.71(1.36-2.15)</td>
</tr>
<tr>
<td>Model2</td>
<td>&lt;0.001</td>
<td>1.63(1.28-2.07)</td>
</tr>
<tr>
<td>Model3</td>
<td>0.001</td>
<td>1.53(1.19-1.95)</td>
</tr>
<tr>
<td>Frail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude model</td>
<td>&lt;0.001</td>
<td>2.47(1.72-3.55)</td>
</tr>
<tr>
<td>Model1</td>
<td>&lt;0.001</td>
<td>2.08(1.43-3.03)</td>
</tr>
<tr>
<td>Model2</td>
<td>0.001</td>
<td>1.97(1.33-2.91)</td>
</tr>
<tr>
<td>Model3</td>
<td>0.016</td>
<td>1.67(1.1-2.53)</td>
</tr>
</tbody>
</table>

Model1 adjusted for age, and gender on crude model. Model2 adjusted for smoking, drinking, education, marital status, occupation, BMI category plus the variables in Model1. Model3 adjusted for diabetes, hypertension, MCI, perceived overall health plus the variables in Model 2.

According to your question, we also described the results of C-PSQI of cut-point of 6.

Comments: The section on possible mechanisms is informative, but it would be useful for the authors to indicate how their own results reflect on likely mechanisms for the association between sleep quality/duration & pre/frailty?
Response: Thanks for this informative advice. We added corresponding comments in this section in the revised manuscripts.

Reviewer 2 (Reviewer 2): PEER REVIEWER ASSESSMENTS:

OBJECTIVE - Full research articles: is there a clear objective that addresses a testable research question(s) (brief or other article types: is there a clear objective)?

Yes - there is a clear objective

DESIGN - Is the current approach (including controls and analysis protocols) appropriate for the objective?

No - there are major issues

EXECUTION - Are the experiments and analyses performed with technical rigor to allow confidence in the results?

No - there are minor issues

STATISTICS - Is the use of statistics in the manuscript appropriate?

Yes - appropriate statistical analyses have been used in the study

INTERPRETATION - Is the current interpretation/discussion of the results reasonable and not overstated?

No - there are minor issues

OVERALL MANUSCRIPT POTENTIAL - Is the current version of this work technically sound? If not, can revisions be made to make the work technically sound?

Maybe - with major revisions

PEER REVIEWER COMMENTS:

GENERAL COMMENTS:
Comments: The authors have investigated an important potential association between sleep quality status and functional outcome now widely being seen as critical for the health outcomes of our aging population, in this case frailty. I have some comments related to the methods and designs that I believe if the authors address will add to the impact of the submission. First, numerous grammatical and sentence structure errors were noted in the manuscript the frequency was such that it became a distraction to reading the study for the overall merits of the content. I strongly advise the authors to undergo editorial revision to improve the overall presentation of their submission.

Response: We are very sorry that numerous grammatical and sentence structure errors were noted in our manuscript. In the revised manuscript, we have checked every sentence carefully and try to correct these errors to make our manuscript easy to read.

Comments: Next, authors should rephrase The categorization of the groups based on PSQ by using the official distinction of greater than or equal to five in signifying poor sleeper status and less than five signifying good sleeper status.

Response: Thank you very much for this constructive advice. According to the article we cited (ref 23) in the revised manuscript addressing the Chinese version of the Pittsburgh Sleep Quality Index (CPSQI), “A CPSQI of greater than 5 yielded a sensitivity and specificity of 98 and 55% in primary insomniacs vs. controls. A CPSQI of greater than 6 resulted in a sensitivity and specificity of 90 and 67%.” We used both cut-point of 5 and 6 to conduct sensitivity analysis. And we reported the results in the revised manuscript.

Comments: Authors should also state if the questionnaires for both frailty and sleep quality were completed solely by the research subject or if it could have been completed by a caretaker/designate. This is critical to notes as many of the measures being reported are based on subjective assessments. Co-variable analysis should also include whether any of the subjects had a current or previous history of being treated for a sleep disorder or any other metric used to determine frailty.

Response: Thank you very much for this useful advice. We added the interview information in the revised manuscript. A large majority of participants were farmers with a lower medical level. They were not treated for sleep disorder or frailty.

Comments: Authors should also provide a bit more detailed summary of the study methods that they noted had been published previously, this is fairly routine as to allow the reader to still have a basic picture of the design and method without having to completely refer to a previous publication.

Response: Thanks for the advice. We elaborated the study methods.
Comments: Finally authors do include covariable analysis that takes into account subjects occupation, however a significantly large percentage of the subjects were farmers and should be discussed as a limitation as well as in the discussion section as to how a Specific occupation such as farming which is not only physically demanding that could impact frailty but an occupation that can also have a particularly unique regimental challenges to one's Sleep - these factors should be considered and factored into the interpretation of these results.

Response: Thank you for this constructive advice. According to this important suggestion, we added this issue as a limitation in the discussion section.