Author's response to reviews

Title: Associations between overweight, obesity, health measures and need for recovery in office employees: a cross-sectional analysis.

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Author's response to reviews: see over
We would like to thank the reviewer for the valuable further suggestions and queries regarding our manuscript. Please see our detailed response below, also indicating the actions taken. In the revised manuscript, the revisions are captured by track changes.

Reviewer's report

Title: Associations between overweight, obesity, health measures and need for recovery in office employees: a cross-sectional analysis.

Version: 2 Date: 6 November 2013

Reviewer: Karen Lamb

Reviewer's report:

Thank you to the authors for their thoughtful responses and for clarifying the issues raised in the previous review. I have some further suggestions and queries regarding the manuscript.

MAJOR COMPULSORY REVISIONS

1. Dependent variables
   Regarding previous review comment:
   "Secondly, you describe a dichotomy for the NFR score, grouping individuals into low or high and only present descriptive statistical information for NFR based on this dichotomy, not for the whole scale. However, you mention that you use linear regression to conduct the analysis which leads me to believe that you treated NFR as a continuous outcome variable. If NFR was indeed treated as a continuous variable in the analysis, please add further clarification in the text as Table 2 makes it appear that the dichotomy was adopted. Also, did the NFR scale follow a normal distribution, meaning the assumptions necessary for the linear regression were valid? Please provide detail on how you verified the assumptions."

   Thank you for your response to this query. Considering that all regression modelling was conducted using NFR on the continuous scale, I am not sure how useful Table 2 is. I would suggest either adding further discussion on the examination of categorical NFR if this cut-point is of clinical interest and conduct adjusted analyses for this binary outcome or changing Table 2 to correspond to the formal regression analysis. For example, Table 2 could be changed to report the mean and SD for NFR by each of your categorical predictor variables and the correlation between the continuous measures and NFR as this will correspond with the analysis presented in Table 3. Alternatively, Table 2 could be removed altogether (and the mean NFR for each BMI category could be reported in the text) as your unadjusted analysis in Table 3 contains information about the relationship between continuous NFR and each predictor. As you do not continue to assess the dichotomised NFR in the analysis, I do not see that Table 2 adds
much to the analysis or discussion.

COMMENT: Thank you for this comment. We agree with the reviewer that Table 2 is not adding value to the manuscript.

ACTION TAKEN: We have removed Table 2 from the tables section and reported the mean NFR with corresponding SD for each BMI category in the results section without referring to a table. The results section now reads as follows:

Results
Study population
The participating employees were on average 41.3 years old (SD=10.3), ranging from 19 to 63 years. Average BMI was 24.9 (SD=4.0) and most employees (58.5%) were classified as having a normal body weight (BMI < 25 kg/m²), 31% was classified as overweight and 10.5% was classified as obese. For two participants, BMI could not be calculated because of missing data on body weight and/or height. The overall mean score of NFR in the total study population was 32.2 (SD=29.3) and a total of 22.8% showed a high need for recovery (>54.5). The mean NFR for the normal body weight, overweight and obesity group were 32.4 (SD=27.6), 27.3 (SD=29.2) and 45.9 (SD=34.9) respectively. The population characteristics are summarized in table 1.

2. Independent variables
Regarding previous review comment:
"Body mass index
I would suggest also considering BMI as a continuous predictor for NFR in the analysis. This would increase the sensitivity to detect differences. You mention in the discussion the difficulties with using BMI as a categorical variable so it would seem logical to consider BMI as a continuous predictor."

Thank you for your response to my query about BMI. It is still not clear to me, however, why you did not examine BMI as a continuous predictor in your analysis. While the WHO thresholds are commonly used, continuous measures are more sensitive and I would suggest using them where possible, particularly when you have the continuous information to hand. You state that you did not expect a linear relationship between BMI and NFR but did you examine the shape of the relationship between BMI and NFR? It may be that a different threshold, rather than the WHO BMI thresholds, may be critical for determining when BMI has an impact on NFR. Did you look at scatterplots of the two continuous measures or attempt to model the relationship between the two continuous variables in any way?

COMMENT: Yes, we did examine the shape of the relationship between BMI and NFR by examining the scatterplots of the two continuous measures, and these did not give indications for alternative thresholds. However, even more important, applying the WHO BMI thresholds enables comparison with other studies.

I see that you have changed focus to overweight and obesity and was wondering if you had conducted a sensitivity analysis to see how changing the thresholds adopted for the categorical variables affected the conclusions reached (e.g. did you compare overweight/obese to normal in dichotomy as this is often conducted
when considering BMI or did you compare obese/normal & overweight)?

**COMMENT:** We have conducted a sensitivity analysis prior to conducting the regression analyses to examine the extent to which the results are being influenced by changing the reference group. Based on this we decided to compare overweight and obesity to normal body weight in dichotomy.

3. Significance level
You state that “The level of significance was set at p<0.05”. However, you consider multiple tests in this analysis and thus an adjustment for multiple testing should be considered.

**COMMENT:** As this is an exploratory study, we decided not to apply a Bonferroni correction. We agree that we should have alerted the reader that multiple testing may influence the relevance of results with a p-value < 0.05.

**ACTION TAKEN:** We have adjusted the discussion section and the text now reads as follows:
“Finally, our level of significance p<0.05 needs attention as this exploratory study involves multiple testing. As the p-values of the results we found were at least ten times smaller than 0.05, applying the Bonferroni correction would not have an changed our results [46].”

4. Results
Regarding previous review comment:
"The results section needs a bit of work to clarify the findings of the study. You put more emphasis on ‘significant’ results than you perhaps should given the fact that p-values are on a continuous scale and that a p-value of 0.05 is simply an arbitrary threshold. In the adjusted analysis of BMI and NFR, the lower confidence limit for obesity is 0.01 and the strength of the association is substantially reduced after adjustment (p-value increased from 0.005 to 0.05). You should highlight this feature and not overstate your findings."

a. Again, to avoid overstating the findings, I would suggest rephrasing this statement “This finding suggests that obesity as compared to normal body weight is associated with a higher NFR”. After taking multiple testing into account, p=0.05 would not be statistically significant. I would also rephrase the abstract with this point in mind. I don't think the results on obesity are as conclusive as the descriptions imply.

**ACTION TAKEN:** We have rephrased the sentence “This finding suggests that obesity as compared to normal body weight is associated with a higher NFR” into “This finding points in the direction that obesity as compared to normal body weight may be associated with a higher NFR”.

Also, we have rephrased the conclusion section in the abstract as follows:
“The findings suggest that self-reported stress is, and obesity may be, associated with a higher NFR.”

b. Did you also consider whether or not differences existed between the obese and overweight group? The unadjusted analysis seems to suggest there may be a difference. Did you formally test this?
COMMENT: Yes, we did test for differences between the obese and overweight group. The single great difference between the overweight and obese group was the distribution of men and women (80% men vs. 20% women in the overweight group and 58% men vs. 42% women in the obese group). However, after testing for effect modification in the regression analysis no necessity of reporting separate results was observed.

5. Sample size
You state that 412 employees signed the consent form. However, in Table 1, you have some sample sizes of 413 and 414. Shouldn’t these all be 412 (or fewer)? It is not clear how you dealt with missing data. Was all missing data across all covariates of interest removed prior to conducting the formal analysis to ensure comparable samples?

COMMENT: A total of 414 employees signed the informed consent. We apologize, as this was incorrectly stated in the methods section. However, two employees did not completely fill in the baseline questionnaire and of these employees data on NFR was missing. Therefore, in table 1 NFR scores are reported for 412 participants, while e.g. age could have been reported for 414 employees. All missing data across all covariates of interest have been removed prior to conducting the formal analysis to ensure comparable samples.

ACTION TAKEN: We have adjusted the Methods section and the text now reads as follows:
A total of 414 employees (response rate: 35%) from 19 departments signed the informed consent, after which 412 employees completed the baseline questionnaire (providing data on NFR) and were included in the Be Active & Relax project.

MINOR DISCRETIONARY REVISIONS

1. General health and mental health
Regarding previous review comment:
"You mention general health twice in the methods- once as a health measure to be investigated and once as a potential confounder. It is not clear to me how these two measures differ or what the definition is of the general health measure in the potential confounders section. I believe that the first health measure is a perceived measure so perhaps the second measure is more objective. However, if the data are from self-reported questionnaires, do these two measures differ greatly? Further detail is required of how the general health confounder is defined and how similar it is to the perceived measure."

Thank you for the clarification on this point. As both measures of general health are the same, I think you need to be more explicit in the text about this. I would perhaps consider rephrasing the Potential Confounders section to state the following:

General health, described previously, was included as a potential confounder of the relationship between overweight and obesity and NFR. Literature shows that obesity and general health are related [41-43].

ACTION TAKEN: Thank you for this valuable comment. We have adapted the reviewers’ suggestion and rephrased the Potential Confounders section:
General health, described previously, was included as potential confounder of the relationship between overweight and obesity and NFR. Literature shows that obesity and general health are related [41-43].

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests: I declare that I have no competing interests.