

Author's response to reviews

Title: Weight- Perception in male career Firefighters and its association with Cardiovascular Risk Factors

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Author's response to reviews: see over



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Re: MS: 1467549955653965- "Weight- perception in male career firefighters and its association with cardiovascular risk factors."

Dear Editors:

Thank you very much for your email of March 16, 2012 with the positive and helpful comments of the reviewers. We are pleased to submit our revised manuscript, "Weight- Perception in male career Firefighters and its association with Cardiovascular Risk Factors". As a result of the peer review process, we are convinced that our manuscript has been strengthened and improved, and it thoroughly addresses the reviewers' concerns and suggestions.

In addition, your editorial cover letter and Reviewer 1 raised some concerns regarding the quality of the text's written English. We were quite surprised by these comments because three of the authors are native English speakers, and all five have completed graduate studies in the US. Moreover, Reviewer 2 who is from the UK found the writing quality acceptable. Nonetheless, we have made concerted efforts to strengthen and tighten the writing throughout. As requested, we have paid particular attention to the abstract.

Based on all of the above, we are confident that our paper is now ready for publication in *BMC Public Health*. Below, we provide numbered, point-by-point responses to all of the referees' comments.

Reviewer 1: Iris F Groeneveld

Interesting and relevant, but much work to do in clarification of methods and results, and elaboration of discussion.

Thank you very much for this very positive overall assessment of the paper. We have made every effort in our revision to clarify the methods and results as well as elaborate the discussion. All significant changes in the revised manuscript are highlighted in color.

MAJOR COMPULSARY

1. Abstract: Conclusion: should be in line with conclusion in manuscript.

Thank you. We have revised both conclusion statements. At present, the abstract's conclusion is consistent and in line with the conclusion of the manuscript.

2. Background. Last sentence: Clearly state the purpose of the study.

Thank you. We have modified the text as specified in order to very clearly state the purpose of our investigation.

3. Methods. What does 'METS' mean and what is its relation with oxygen consumption (see also abstract)?

"METS" stands for Metabolic Equivalents, the most common, clinically applied measure of exercise capacity. Peak METS estimate VO₂ max during a treadmill test. The conversion between METS and VO₂ is as follows: 1 MET = 3.5 ml/kg/min VO₂. We have expanded our definitions of METs in both the methods and in the abstract sections.

4. Discussion: Did you use body fat as a measure of adiposity/ overweight/ obesity? If not, leave it out. If so, describe it in the results, provide the cut-off points for overweight/ obesity, and mention that body fat was measured in only part of the participants (and does that influence the results/ could it be biased?).

Thank you for this question. We used body fat estimates as a continuous measure of adiposity. Clearly the results show very high levels of statistical significance across the categories of measured/perceived weight with a strong dose-response trend. There is no reason to specify cut-off points in the manuscript as none were applied. Again, body fat was used as a continuous measure, not a categorical one. Although it was measured in only a subset of participants, this related only to the timing of the medical exams. One of the clinics added body fat estimates after the start of data collection. Thereafter, it was applied to all subsequent participants in consecutive fashion. Thus, no differential selection bias would be incurred. Moreover, the clinics' estimations of body fat were done completely blind to the hypotheses and purposes of the present study. Thus, any bias would be non-differential and there is no reason to suspect that it would influence our results in any particular direction.

5. Mention as a limitation: for body fat, in some workers BIA was used and in others skin fold measures. To what extent are these measures comparable, and does it influence your results?

Thank you. We agree that this is a minor limitation and in the revision mention it as such. However, this limitation does not in any way influence our results as the measurement technique varied by clinic, but not by weight category or by perceived weight category.

6. Lack of waist circumference. WC is a strong predictor of CVD, and necessary for determining MetSyn (another reason to leave MetSyn out).

We agree that WC is a useful measure and one with epidemiologic validity. However, the fact that the fire department clinics did not measure it is only a very minor limitation. We have recently published on MetSyn using modified criteria, where a BMI cutoff is used rather than WC (Baur et al, J Strength Cond Res. 2011). Moreover, another recent study in firefighters showed that the false positive rate for BMI derived obesity was relatively low when compared to both body fat percentage and waist circumference (Poston et al, JOEM 2011). It was more often the case that BMI-based obesity classification missed individuals who had excessive centripetal body fat limited to visceral trunk obesity (high waist circumference). Therefore, our data which used modified criteria for MetSyn based on BMI are probably mild underestimates. Moreover, our results for MetSyn were highly significant with and without multivariable adjustment. Therefore, we have chosen to leave MetSyn in the analyses.

7. Conclusion: Provide the answer(s) to your research question(s).

Thank you. As described above, we have revised the conclusion and it addresses the research questions elaborated in the purpose of our study.

MINOR ESSENTIAL:

1: Check abbreviations. All abbreviations should be preceded by the whole word or term the first time they are mentioned, in the abstract as well as in the manuscript. (CRF, METS, etc)

Thank you very much. We have checked all abbreviations and adjusted them in accordance with the guidelines of BMC Public Health.

2. Stick to ‘weight perception’ (not weight self-perception, weight-perception, or body perception). Be consistent.

Thank you for this important suggestion. We have revised the text and use weight perception throughout.

3. Check the correctness of capitals (e.g. in ‘Metabolic Syndrome’, ‘Body Mass Index’. Cardio-respiratory Fitness’ and be consistent. Remove capitals from title.

Thank you. We have done so throughout according to the author’s instructions from BMC Public Health.

Background

4. Last sentence: Remove last half of last sentence (‘ while at the same time...)

5. current § 1, first sentence: delete the word ‘root’

6. current § 1 1, last sentence: delete the word ‘ apparently’

Response to comments 4, 5 and 6:

As per the reviewer’s request, we have deleted all wording specified above.

Methods

7. § 1: ‘ eligible fire departments’: how did you determine the eligibility, i.e. on what basis were these departments recruited?

We have deleted the word ‘eligible’ in that sentence because it is misleading in this context. The inclusion criteria are clearly stated.

8. § 1: what do you mean by ‘ work restrictions’?

Thank you for this comment. ‘Work restriction’ in the context of the firefighting profession describes firefighters who have some sort of physical or medical limitation and are thus, not allowed to perform all necessary duties. We have further clarified the text by specifying that being “full duty” at the time of examination was one of the inclusion criteria.

9. § 2: explain ‘ resting state’

Resting state means at rest. In other words, the pulse and blood pressure measurements in our cohort were taken at rest. We did not use pulse and blood pressure results just prior to the treadmill exercise test, which might be influenced by anticipatory anxiety. We have changed the wording to resting pulse and blood pressure to avoid any confusion. Thank you.

10. § 3: Bruce protocol: provide reference.

Thank you very much for this suggestion. We have inserted the following reference in the Methods section (color highlighted):

“Bruce RA. Exercise testing of patients with coronary disease. Principles and normal standards for evaluation. Ann Clin Res 1971;3;323-32.”

11. § 5: explain outcome categories for exercise (necessary for interpretation of table 3)

The outcomes of the treadmill tests were described as above in peak METS, which estimate VO₂ max or cardiorespiratory fitness (CRF). We have also added more specificity to Table 3 regarding weekly exercise to emphasize that it refers to number of days per week.

12. § 7: elaborate statistical analyses, in order to better understand the results. What were the dependent and independent variables in the logistic and linear regression analyses?

Linear models regression models were used to evaluate the associations among the six BMI/weight perception categories (independent variable) and various cardiovascular risk factors (dependent variables) while adjust for other co-variables. Logistic regression analyses were used to calculate odds ratios (95% CI) for underestimating one’s weight category (dependent variable) as a function of BMI as a continuous independent variable.

We have made this more explicit in the text of the methods- statistical analysis. Thank you.

Results

13. MetSyn is not a continuous variable, although you used it as such in the logistic regression analyses. Explain.

Metabolic Syndrome (MetSyn) is a binary variable and was only analyzed as such. Thank you.

Table 1:

14. Add baseline diastolic BP, total chol, chol ratio, glucose, HRR1, and pulse.

15. Revise (correct and complete) abbreviations under table.

Thank you for requesting clarification. We have included the requested baseline characteristic information, and we have checked and corrected all abbreviations as specified (please see color highlights in Table1).

Figure 1.

16. Unclear. explain that the colored bars represent weight perception.

17. Adjust colours; grey tones are hard to distinguish.

18. Table under the figure: remove or present as a separate table, with clear explanation of columns and rows.

Thank you. We have adjusted the figure legend according to your suggestion. Regarding the colors, we submitted the figure for review in color. We have removed the table under the figure as the information is redundant.

Table 3.

19. unclear. Does it represent the association between CVD risk factors and underestimation of weight category (y/n)? explain in title.

Thank you for requesting clarification. We have changed the title to reflect that we are presenting various cardiovascular risk factors as a function of BMI and weight perception category.

20. Number of participants in whom body fat was measured is small. Explain.

Please see above our reply to Major Compulsory comment #5. Thank you.

Figure 2.

21. Leave out, irrelevant. Number of participants with BMI of 40 and over is negligible.

We respectfully disagree with the Reviewer here. What Figure 2 demonstrates is that among obese participants, the probability of correctly recognizing oneself as obese actually increased as BMI increased. Moreover, only as the BMI approaches extreme and less common values do a sizable proportion of firefighters correctly perceive their weight category.

Discussion

22. § 2, 2nd sentence: ‘ as the self-perception of weight increased...’ Incorrect, as weight perception is a dichotomous variable.

Thank you. We have clarified the sentence to specify that as BMI (continuous) increased, the likelihood of correct weight perception (dichotomous) increased among obese participants.

23. § 2, 3rd sentence: unclear.

24. § 2, last sentence: unclear. ‘ any differences based on perception are accounted for by..’ ?

Thank you, the wording has been rephrased.

25. § 4: ‘.... especially if subjects are obese but relatively healthy they may have more underestimation of...’ Replace by: ‘ they may be more likely to underestimate’.

Thank you, the wording has been rephrased as requested.

26. What do you mean by adiposity? You did not introduce this term before. Better to leave out and replace by overweight/ obesity.

Adiposity comes from adipose tissue and refers to fat mass. We have introduced and defined the term in the revised introduction. The term is important because it differentiates between increased weight due to fat as opposed to muscle. Thank you.

27. ‘ The results emphasize the importance of objectively measuring weight and adiposity.’ Replace by the importance of ‘objectively determining BMI’

Done. Thank you for this suggestion.

DISCRETIONARY:

Background

1. Change the order of paragraph (§) 1 and 2: § 1 According to the WHO.... ; § 2 Perception of one’s...

We have switched the order of the paragraphs as suggested.

2. Delete § 5: you mentioned this information in current § 1.

Thank you for this suggestion. Paragraph 5 of our background section now states clearly the purpose of our investigation, as requested by you above (Major Compulsory comment 2). Therefore, we did not delete it.

Methods

3. § 3: Is it necessary to mention ‘ maximal age predicted heart rate’ ?

Thank you. Yes, it is necessary. Achieving the age predicted heart rate defines a maximal exercise stress test in comparison to a sub-maximal stress test. Only the former accurately estimates VO₂ max. Maximal exercise testing for all subjects is a major strength of our study.

4. § 3: METS do not only depend on oxygen consumption. Provide the definition/ calculation of METS. And why did you not determine and present VO₂peak?

We have defined METS and explained its determination thoroughly. Please see replies to Major Compulsory comment #3 and Minor Essential comment #11 above.

5. § 4: You cannot just replace abdominal obesity by BMI. Explain your rationale and the limitation of doing so.

6. § 4: Leave out MetSyn, as it is composed of the variables you already present, and as information on abdominal obesity is missing.

Thank you. Please see our response to Major Compulsory comment 6.

7. § 5: was it a validated questionnaire and if so, provide validity and/or reliability

Thank you for this question. We have used a questionnaire especially developed at the Harvard School of Public Health for the special requirements of career firefighters. The questionnaire's has not been officially validated.

8. -overweight and obese subjects who underestimate their BMI are ‘relatively’ healthy regarding CVD risk factors. Why would it be so urgent to change their weight perception?

Thank you for this question. The key word is “relatively”. Whereas they are relatively healthier compared to more obese colleagues, they are less healthy than colleagues whose measured BMI category is normal.

9. - In muscular persons, would BMI 25 be a correct cut off point for overweight? Check the literature.

While we agree that individual subjects with high muscle mass may be misclassified by traditional BMI cutoffs, different cutoffs for BMI among muscular persons do not exist. This is where more direct measures of adiposity are useful. This question has been evaluated in firefighters and contrary to popular belief, BMI was more likely to underestimate obesity rather than overestimate it (Poston et al, JOEM 2011). Please see our response above to Major Compulsory comment 6.

10. - To perceive oneself as overweight does not always lead to the intention to lose weight (which is a variable you assessed in the questionnaire). Some persons may be OK with being skinny or overweight.

We agree and that is why we asked the question. How do they view their weight in terms of desiring weight gain, weight loss or no change, etc.

11. -You measured eating habits. These are strongly related to overweight (even more than exercise) Why did you not present these in the results?

To elaborate on specific eating habits would go well beyond the purpose and scope of the present manuscript. As above, however, we did address it in so much as we asked about their desire for weight change.

12. - Last sentence: You did not mention anything about the association between weight perception or BMI and 'healthy and 'fit'. In fact, overweight persons can be healthy and fit too. Leave out or explain in discussion.

Thank you we have deleted the comment.

Reviewer 2: Christopher William Ide

Dr Kales leads a group of researchers which has published several papers over the years which have added useful new knowledge on various aspects of firefighter occupational health. This is another example of their work, which would be of relevance no medical advisers of uniformed/disciplined emergency, public safety or armed forces. I can think of no major compulsory or essential revisions, however.

Thank you very much for your kind words about the research group and very positive overall assessment of the present paper.

1. There is an opportunity to improve the presentation of results. I would suggest that the figure - 728 - the population who took part in the study - should appear at some point in the abstract, and very much earlier in the results section. AFAIK, it first appears in table 1 (p21).

Thank you. We have revised to mention the number of participants (n=768) in the abstract and at the outset of the results section on page 9.

2. In the Methods section the researchers state that those who undertook the tests for symptom evaluation, retirement pensions, disability examinations, etc were excluded. It would be interesting to know how many fell into each category, and how many of those eligible declined to take part. It might have been interesting to see if there were any differences, eg age, length of service, etc between those who participated and the others. This is particularly relevant if there were a large number excluded, and one was seeking to generalise the results over a wider population.

Thank you very much for this question. Career firefighters who did not fulfill the inclusion criteria were not consented into the study. Therefore, there is no possibility to rigorously describe the excluded subjects and compare them to those who consented. Notwithstanding that limitation, we know anecdotally that exclusions were very few.

3. I found it rather difficult to understand Fig 1. The BMI categories might be a bit easier on the eye if presented thus 3: BMI ≥ 30 , 2: BMI 25 – 30, 1: BMI ≤ 18.5 - <25 .

Thank you for this comment. The BMI categories were presented as the reviewer suggested. Moreover, we have re-worked the figure so that each category and its defining range are at the same height as the numbers 1-3 on the figure.

Thank you very much in advance for your valuable time and consideration. We look forward to hearing from you soon regarding the revision.

Sincerely,

A handwritten signature in blue ink, appearing to read "Stefanos N. Kales". The signature is fluid and cursive, with a long horizontal stroke extending to the left.

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