Author's response to reviews

Title: Diet and lifestyle factors associated with fish consumption in men and women: A study of whether gender differences can result in gender-specific confounding

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Author's response to reviews: see over
Diet and lifestyle factors associated with fish consumption in men and women: A study of whether gender differences can result in gender-specific confounding

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Additional formatting request:

- Please include a Conclusions section as the last section of the text. This should state clearly the main conclusions of the research and give a clear explanation of their importance and relevance. Summary illustrations may be included.

Reply: The last section of the text is now a conclusions section (page 10).

- Please include an Authors' Contributions section at the end of the manuscript, before the reference list. We suggest the following kind of format (please use initials to refer to each author's contribution):

?AB carried out the molecular genetic studies, participated in the sequence alignment and drafted the manuscript. JY carried out the immunoassays. MT participated in the sequence alignment. ES participated in the design of the study and performed the statistical analysis. FG conceived of the study, and participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

Reply: Author contributions have been added as requested (page 10).

- Please include an acknowledgement section at the end of the manuscript before the reference list. Please acknowledge anyone who contributed towards the study by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. Please also include the source(s) of funding for all authors. Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements.

Reply: The previous heading Fundings has now been replaced with Acknowledgements. There are no further acknowledgements (page 10).

Editor's notes:

- Please include complete reference information for the reference 10.

Reply: Reference 10 has now been corrected in the reference list.
Reviewer 1

**Title:** Diet and lifestyle factors associated with fish consumption in men and women: A study of whether gender differences can result in gender-specific confounding

**Version:** 1  **Date:** 5 June 2012

**Reviewer:** Kylie Smith

**Reviewer’s report:**
This paper examines diet and lifestyle correlates of fish consumption in a large sample of Swedish men and women. The authors were interested in examining potential sex difference for lifestyle and dietary correlates of fish consumption, after they previously reported eating fish more than three times per week was associated with an increased risk of stroke in men but a decreased risk for women. Although the findings from the authors’ previous paper on fish consumption and stroke prompted the current paper, I think the current paper should stand alone. The abstract and discussion refer to the earlier paper on stroke and this is not appropriate.

**Reply:** We agree that the discussion should be more generalized and has rewritten some sections. However, we would prefer to keep focus on the previous stroke study – this paper was submitted as a short report and is thus appropriate as an extension of a previous study. The analyses referring to the stroke study have been moved from the discussion to results as appropriate.

**Major Methods**

1. The data comes from a large population based sample but more information is needed to determine the generalisability of results. Please provide more information on the recruitment of participants. How are eligible participants identified? Are all citizens of the appropriate age (30, 40, 50, 60 years) invited to participate in the health examinations? If not how are participants selected?

**Reply:** Clarifications have been made concerning recruitment of patients, participation rate and analysis concerning selection bias (page 4). References have been added concerning dropout analysis (reference 14, Weinehall et al., and Norberg et al., submitted).

2. Were the health examination held annually since 1985?

**Reply:** Health examinations have been continuously conducted since 1985, which now is stated in the manuscript (page 4, paragraph 2)

3. The fish questions from the FFQ have been validated using erythrocyte levels of EPA and DHA which is a strength of this study.

**Reply:** Thank you for noticing this strength.

4. The fish consumption data is dichotomised to >3 times per week or #3 times per week, please justify why this cut point was used.

**Reply:** The dichotomization of fish consumption was based on the finding in the previous stroke study, to identify high consumers of fish. However, analysis was also conducted with categories <once a week, 1-3 times a week and >3 times a week and with fish consumption as a continuous variable (Spearman correlation). As now stated in the manuscript (page 7, paragraph 2), fish...
consumption was generally associated with healthier lifestyle also when comparing those reporting fish consumption 1-3 times/week compared to < once a week. We have now submitted a new figure with these data (Figure 1). The figure can be in the manuscript or as additional data, whatever you prefer. If you prefer to publish this new Figure as additional data the other figure (now Figure 2) should be named Figure 1.

Results
1. What was the response rate?
Reply: See methods 1 above.

2. Second last paragraph referring to using finer categories for fish consumption “… fish consumption was associated with healthier behavior over the whole scale....” This sentence isn’t very clear, please explain in more detail what you mean by whole scale.
Reply: The sentence has been changed (page 7, paragraph 2).

Discussion
1. Third paragraph is not clear. When you say “Alcohol consumption was not adjusted for in that study...” it looks like you mean the study mentioned in the previous sentence (referring to ref 17), but I think you mean the study mentioned at the start of the paragraph?
Reply: The sentence has been changed, to clarify that it concerns the previous stroke study (page 9, paragraph 2).

2. Please remove the analyses referring to the stroke paper. The current paper is investigating potential gender differences in diet and lifestyle variables associated with fish consumption. Although your stroke paper provided the idea for the current paper, I don’t think it is appropriate to examine the association between fish consumption and stroke adjusted for alcohol intake in the current paper.
Reply: We agree that this is slightly outside the main focus but would prefer to keep this information in the manuscript. However, the analyses referring to the stroke paper have been moved to the result section (page 8, paragraph 2). Also see general comment above.

3. Please include the limitations of the study in the discussion.
Reply: Possible reporting bias has been added as a limitation in the discussion (page 8, last paragraph).

4. Table 1. I don’t think the three fish variables (fish, lean fish and fat fish) should be included in this table because these are the variables that define fish consumption therefore you would expect higher values in those who ate fish >3 times per week.
Reply: We have removed the variable fish from the table, but prefer to keep lean fish and fat fish. We agree they are not informative considering difference between low to moderate and high consumers of fish, but they are of interest to the reader considering the distribution of fat and lean fish consumption in this population.

5. Figure 1. This is a very effective way to visually present the data.
Reply: We agree. Thank you. Note that this is now Figure 2 (but should be changed to Figure 1 again if you prefer to publish the current Figure 1 as additional data).
Minor

Introduction
6. Another paper you could reference - Barberger-Gateau et al (European Journal of Clinical Nutrition, 2005) have also examined correlates of fish consumption.

Reply: The suggested reference has been added (page 3, paragraph 1).

7. Please write FIL out in full the first time it is used. How was calorie intake calculated, did the FFQ include information on portion size? How was basal metabolic rate calculated?

Reply: Food intake level (FIL) is written in full on page 4, paragraph 2. Calorie intake was calculated from the FFQ. Respondents indicated their average portion of potatoe/rice/pasta, meat/fish and vegetables by comparing with four color photographs of plates with increasing portion size. For the other food items natural portions (such as an apple) or a standard portion for sex and age (based on data from a validation study) was used. This is described in reference Johansson et al. Validation and calibration of food-frequency questionnaire measurements in the Northern Sweden Health and Disease cohort. Public Health Nutr. 2002;5:487-96. Basal metabolic rate was calculated with Harris-Benedict equation for men and women.

Methods
8. Statistical analysis Line 6 – I think you been mean reference group not baseline? “…levels in the low-to-moderate consumers were considered as the reference group in each gender”.

Reply: Yes, correct. Baseline has been replaced with reference group (page 6, paragraph 2).

Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Needs some language corrections before being published
Statistical review: No, the manuscript does not need to be seen by a statistician.

Reviewer 2
Title: Diet and lifestyle factors associated with fish consumption in men and women: A study of whether gender differences can result in gender-specific confounding

Version: 1 Date: 15 June 2012

Reviewer: Anu Turunen

Reviewer's report:
MAJOR COMPULSORY REVISIONS
1. The title of the article should be sharpened. Especially the subtitle needs improvement. “confounding” stands out from the title even though that topic is not very profoundly discussed in the actual manuscript.

Reply: We agree that the title is a bit complicated. However, we find it important to include the aspect of possible gender differences in confounding factors already in
the title, to highlight to the reader that this is the focus. The discussion has been somewhat rewritten, to justify the title.

2. In Introduction, the amount of evidence regarding the association between fish/omega-3 PUFAS and CVD is a bit understated. There is a large body of evidence and this should be highlighted.
   
   **Reply:** The introduction has been somewhat changed to clarify that there is substantial evidence of a protective association of fish consumption on cardiovascular risk (page 3, paragraph 1).

3. The hypothesis regarding fish as a marker of unhealthy diet that comes up in Discussion (last paragraph) should be more clearly stated also in Introduction.
   
   **Reply:** The hypothesis has been more clearly stated in the introduction (page 3, paragraph 1).

4. Is the division of fish consumption >3 times/week (high) and <=3 times/week (low-to-moderate) well grounded? As far as I understand, <=3 times/week is not very low or even moderate. In many countries, the official recommendation for fish consumption is "at least two times/week" which is quite high and not commonly reached. Lower category limit would be more realistic and the number of "high-consumers" would become bigger. Three or more categories could also be suitable.
   
   **Reply:** See reviewer 1, methods 4: The dichotomization of fish consumption was based on the finding in the previous stroke study, to identify high consumers of fish. However, analysis was also conducted with categories < once a week, 1-3 times a week and >3 times a week and with fish consumption as a continuous variable (spearman correlation). As now stated in the manuscript (page 7, paragraph 2), fish consumption was associated with healthier lifestyle also when comparing those reporting fish consumption 1-3 times/week compared to < once a week. We have now submitted a new figure with these data (Figure 1). The figure can be in the manuscript or as additional data, whatever you prefer. If you prefer to publish this new Figure as additional data the other figure (now Figure 2) should be named Figure 1.

5. The second paragraph in Results section is disappointing since data is not shown: these results could have been shown instead of dichotomous representation.
   
   **Reply:** See above.

6. Discussion is lacking comparisons with previous studies and summary of the totality of evidence and thus, the true character of discussion is missing. The Discussion should be re-written.
   
   **Reply:** The discussion has been somewhat rewritten.

**MINOR ESSENTIAL REVISIONS**

7. When reporting “correlations”, the word “coefficient” should be added --> "Spearman correlation coefficient"
   
   **Reply:** The word coefficient has been added as requested (Abstract, page 6, page 7)

8. When reporting associations, the direction should be added --> “positively/inversely associated”
   
   **Reply:** The directions of the associations have been added.

Reply: The expression “Tendency-to-report –healthy bias” has been deleted (page 9).

10. The use of word “bias” should be checked, e.g., the term “gender bias” sounds a bit weird.
Reply: The expression gender bias, which was incorrect in the sentence, has been deleted (page 3).

11. The use of English language should be revised by a native English speaker. Some examples:
- Word order and word choices, e.g., “reveal” or “interesting” are not the best choices for scientific texts, “plots” in the last paragraph of Results section
- Singular versus plural, e.g., Health examinations…has --> have
- Prepositions, e.g., correlate to --> correlate with, confounding of --> confounding by, association of --> association between
- The use of commas.
- The use of hyphens, e.g., 84 item --> 84-item

Reply: The language has now been revised by a native English speaker.

12. Table 1 should be divided so that it is easy to distinguish between the rows. The fact that the row titles are divided into two rows does not improve legibility.
Reply: Table 1 has been changed as requested.

13. Does “Fat and lean fish intake” in the title of Figure 1 mean total fish? This should be clarified.

Reply: The figure (now named Figure 2) has been refined. Fat and lean fish have been removed from the title as what is presented is total fish.

14. If possible, Figure 1 should be refined so that it becomes easier to understand, e.g, boundaries for zero correlation and negative correlation could be picked out.

Reply: The figure (now Figure 2) has been refined.

DISCRETIONARY REVISIONS

15. There is a word “Findings” before “Introduction” - is this a typo?

Reply: Yes. The word Findings has been deleted.

16. The main headings do not follow the Journal instructions “Background, Methods, Results and discussion, Conclusions”. Especially “Discussion with conclusion” is strange.

Reply: The headings have been changed according to the journal instructions.

17. Conclusion could be under its’ own title.

Reply: Conclusions is now standing alone as the last title.

18. I would not use the verb “donate” when referring to giving blood samples for research purposes.

Reply: The word donate has been changed to give blood samples (page 4, paragraph 2).
19. The selection of fruit and berries looks a bit limited: only apple/orange, banana and berries? Could this be explained?

**Reply:** Thank you for pointing this out – this was incorrect. In the food frequency questionnaire, there were one question concerning apple/pear/peach/citrus fruit, one question concerning bananas and one question concerning berries. This has now been corrected in the manuscript (page 5, last paragraph and Figure 2).

20. Personally, I would prefer “root vegetables” over “roots” although the latter is also correct.

**Reply:** The expression root vegetables is now used instead of roots.

21. In the first paragraph of Results section, an expression “high-consumers or low-to moderate-consumers” is used. When combined with “male or female”, the text becomes a bit stiff. Longer expression such as “those women who consumed a lot of fish” would make the text more pleasant.

**Reply:** The expression has been changed in some of the sentences (page 7), to make the text more pleasant to read.

22. In Table 1, it might be a good idea to decide whether to report systematically either “positive” or “negative” characteristics regarding physical activity, smoking and education, for example, “Physically active, Non-smoker, Academic education”.

**Reply:** We considered changing systematically to “positive” characteristics (like non-smokers instead of smokers) in Table 1, but then there would still be some “negative” continuous characteristics (like strong beer and spirits). We therefore decided to stick with smokers, as is more common in baseline characteristic tables.

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

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

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