Author’s response to reviews

Title: The effects of fatty fish intake on adolescents' nutritional status and associations with attention performance: Results from the FINS-TEENS randomized controlled trial

Authors:
Katina Handeland (khan@nifes.no)
Siv Skotheim (siv.skotheim@uni.no)
Valborg Baste (valborg.baste@uni.no)
Ingvild Graff (ingvild.graff@uni.no)
Livar Frøyland (livar.froyland@hi.no)
Øyvind Lie (oyvind.lie@fiskeridir.no)
Marian Kjellevold (marian.kjellevold@hi.no)
Maria Markhus (maria.wik.markhus@hi.no)
Kjell Stormark (kjell.stormark@uni.no)
Jannike Øyen (jannike.oyen@hi.no)
Lisbeth Dahl (lda@hi.no)

Version: 1 Date: 09 Jan 2018

Author’s response to reviews:

Dear reviewers and editor.

Thank you for reviewing this manuscript and we appreciate your constructive and helpful comments. We have revised the manuscript according to the reviewers’ comments with revisions in the manuscript highlighted in yellow. This letter explains point-by-point the details of the revisions in the manuscript and our responses to the reviewers’ comments.

Reviewer #1: This manuscript describes a chronic intervention study assessing the effects of dietary supplementation with fatty fish/omega-3 capsules on nutritional status and its association with attention performance. The study appears to be have conducted using rigorous methods; it is a shame that despite all the researchers' efforts, dietary compliance in the fish group was poor.
The manuscript is clearly laid out and all procedures are described in adequate detail. Some minor comments:

1. A table displaying all the nutritional status data for d3, iron and iodine status would be useful to readers; otherwise there is no indication of the direction of the difference between groups stated in Ln 339. This table might also be useful for other researchers in the field.

Response: We see what you mean, but we believe that the nutritional biomarker data are adequately displayed in Table 2 and 3: In Table 2, the baseline levels of each nutritional biomarker are given, and in Table 3 the post-intervention levels of the same biomarkers are given in addition to the calculated change from baseline to post. The presentation of baseline and post levels in two tables may seem confusing to some, but we concluded that it was the best way to give space for the large amount of results from when there are three intervention groups.

To indicate the direction of the difference between groups in line 339 (now lines 327-330), we have included some additional information which reads: ‘The fish group showed a mean increase in s-25(OH)D concentration of 5.3 nmol/L, whereas the increase in the meat and supplement group was 1.8 and 2.6 nmol/L respectively, and the initial analyses showed no differences between the groups.’

2. Despite the evidence drawn from McNamara et al. 2010, it would still be good to see a justification for the 12 week intervention when it could also be argued that a longer intervention may be more effective.

Response: We agree and have included some additional discussion about the duration in lines 449-454.

3. Given the association between fatty fish intake and TN at baseline, more sensitive measure of processing speed e.g. response times in milliseconds may be useful in future studies, along with the recommendations for other tasks.

Response: Thank you for that relevant comment; we have included this in lines 411-413 in the discussion.

4. The average intake of fatty fish meals was 1 per week in the sample, in a group that are already consuming fatty fish, why was compliance in the fish intervention group so poor? What recommendations can be made for future studies? Or indeed policy to increase fatty fish consumption?

Response: We believe that the main reason for the low compliance was that we had to serve the meals cold due to hygienic restrictions and practical (logistic) reasons. We have included an explanation of this now in the discussion, lines 440-443.
Reviewer #2: In this manuscript, the authors present the result of The Fish Intervention Studies-TEENS (FINS-TEENS, a randomized trial comparing the intake of fish, meat, and omega-3 fatty acid supplement, on attention performance assessed by the d2 test of attention, and red blood cell fatty acids, 25-hydroxy vitamin D, s-ferritin and urinary iodine concentrations in adolescents in secondary school. 12 weeks of the intervention led to an increase in DHA and the omega-3 index in the supplement group compared to the fish and meat groups, and in the fish compared to the meat group. No differences between groups was seen in the attention performance measured by d2 test of attention, and no changes in the other biomarkers mediated performance in the d2 test of attention. These findings further contribute to a mixed body of evidence related to the impact of omega-3 fatty acids and/or fish intake as it relates to cognitive performance. It is therefore critical to publish the results of this study to avoid publication bias which often favors papers with "statistically significant" results. Overall the manuscript is very well constructed, but could benefit from the consideration of the following:

All comments below refer to the authors’ numbering (i.e., that associated with the double-spaced lines)

1) Abstract line 49: what and how long the intervention was would fit better under the methods subheading rather than the background.

Response: We have revised the abstract according to your comment, see changes highlighted in yellow, lines 45-46.

2) Abstract line 59: inserting the NCT number in the abstract would be helpful

Response: We have included the NCT number in the abstract, lines 50-51.

3) Line 61: replace "gave" with "resulted in"

Response: This is changes accordingly (line 53).

4) Line 134 and throughout: replacing "subject" with participant better reflects the ethics statement above, where the term "participant" is actually used

Response: The word Subject is replaced accordingly throughout the manuscript.

5) Line 174: the authors could explain why age, weight, height no measured directly

Response: As the schools only gave us limited time for the whole data collection, height and weight were not measured in order to prioritize the cognitive tests and blood and urine sampling. This explanation is now included in lines 169-170 in the methods.
6) Line 215: could you state which standards or how many standards were used in the fatty acid analysis

Response: Fourteen Nu-chek standards were used for the fatty acids analysis. In addition, we have an in-house standard for internal reproducibility (human serum).

7) Line 339: there is a space missing between group and gave, and "respectively" and "associations" are spelled incorrectly.

Response: This is now corrected (lines 331-332).

In addition, the two articles attached as supplemental files for peer review only have now been published, and consequently included in the text with reference (ref. 16 and 25).

We would also like to inform you that our organization is merged with the Institute of Marine Research and we have therefore changed the connection and email addresses of some of the co-authors.