Reviewer's report

Title: Omega-3 fatty acids status in human subjects estimated using a food frequency questionnaire and plasma phospholipids levels

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Reviewer: M Elizabeth Sublette

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This is a biomarker validation of a food frequency questionnaire to assess the omega-3 fatty acids status of the French-Canadian population in Quebec City using plasma phospholipid levels. The sample size is appropriate.

The following are major compulsory revisions except where indicated as discretionary.

General writing style:
1. The writing style is generally understandable, but the English is somewhat stilted and must be proofread for many small grammatical errors.

Introduction:
2. Factual error: the authors state that the FFQ was previously validated in French-Canadian men and women but actually according to their earlier publication [Goulet et al. 2004] it was only validated in women, while reproducibility was done in a very small sample of 17 men and 15 women.

Methods:
3. The FFQ assessment of n-3 fatty acid intake is not adequately described either in this article or in their previously published report. The readers will want to know how many of the original 91 items were used to assess n-3 intake and which food groups were included. Discretionary revision: It would be interesting to find out whether particular dietary items or a subset thereof are the best predictors of biomarker levels.

Results:
4a. The statistical differences between men and women in demographic/clinical characteristics are adequately noted in the text and do not need to be featured in Table 1. It would be relevant for Table 1 to present demographic characteristics for the sample as a whole, for purposes of a general understanding of how representative this sample is of the target population (French-Canadian Quebecers) and how it compares to other populations that have been studied with regard to n-3 intake. Discretionary revision: It might be informative to perform a logistic regression of the predictive value of dietary intake for plasma phospholipid levels, and include sex as a predictor variable in the model, with interactions.
4b. The authors should report on sensitivity and specificity of FFQ classification into plasma-determined quartiles or quintiles.

Literature cited:

5. They cite several studies, but omit a number of other relevant biomarker validation studies, e.g.:

Astorg et al., 2008
Fawzi et al., 2004
Garland et al., 2008
Laviolle et al., 2005
Mina et al., 2007
Olsen et al., 2008
Parra et al., 2002
Sublette et al., 2011

Novelty and significance:

6. The authors do not make a strong case for the value of this study in terms of novelty and therefore significance. E.g., they state in the Abstract that the purpose of this study “was to verify whether intakes of n-3 FA estimated from a food frequency questionnaire correlate with n-3 FA levels measured in plasma phospholipids” and in the Discussion, that “Results from this study re-affirm that n-3 dietary intakes estimated using a FFQ correlate modestly with the corresponding FA levels in plasma PL.” This finding has been replicated previously in a variety of n-3 FFQs. Similarly, in the Abstract and paper Conclusions, they state “this FFQ could be used as a simple, low-cost tool in future studies....” There is nothing that suggests this tool is more useful than any of the multiple n-3 FFQs that have been reported on in the last few years, unless they publish the FFQ instrument itself, however, and then at least the availability factor would increase the usefulness of the instrument to other scientists.

In fact, the one distinguishing characteristic of this study is that it was done in a particular population that may not have been studied with respect to n-3 intake. They do state that, “Overall, results indicate lower levels of n-3 FA in plasma PL in the French-Canadian population.” However, they don’t highlight this finding in Abstract or Conclusions. More focus on this angle would make the article more viable and might have some public health ramifications for French-Canadians.

Discretionary revisions: There are a variety of ways this might be accomplished. For instance, they could delve into the data more to comment on which foods are low intake, and perhaps comment on cultural or economic factors involved. They could create a table comparing their findings with dietary n-3 studies in this and other populations. They could comment on whether lower n-3 intake seems to be epidemiologically related to the incidence of heart disease or depression in this population.
**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, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests.