

Validation of a food frequency questionnaire for the assessment of n-3 fatty acid intake in Switzerland

Project: 517

*Dr. Isabelle Herter-Aeberli, Institute of Food, Nutrition and Health, ETH Zürich, LFV D22
Human Nutrition Laboratory*

Background:

Omega-3 polyunsaturated fatty acids (n-3 PUFAs) are important dietary components for health and disease prevention. A deficiency has been associated with the pathophysiology of many diseases, including major depressive disorder (MDD). Currently, there is no validated method for estimating dietary n-3 PUFA intake in Switzerland.

Objectives:

The Omega-3 paediatric MDD study is currently investigating PUFA supplementation as an alternative treatment of MDD in children and adolescents. In this context, the need of a fast and simple assessment tool for n-3 PUFA intake arose. The aim of this project was therefore, to develop and validate a semiquantitative food frequency questionnaire (FFQ) to suit the Swiss population and their dietary habits.

Method:

The validity of the FFQ was tested against a 7-day weighed food record (FR) (n=36) and against the fatty acid (FA) composition of red blood cell (RBC) membranes (n=152) in two different cohorts. RBC membrane FA composition (% of total FAs) was measured in washed red blood cells using gas chromatography coupled to mass spectrometry. The extent of agreement between the FFQ and the FR was assessed using Wilcoxon signed-rank test, Spearman's correlation coefficients, and Bland-Altman plots. To assess the agreement between the FFQ and RBC membrane composition Spearman's correlation coefficients, adjusted linear regression and Kappa statistics were used.

Results:

There was no statistically significant difference between the n-3 PUFA intake determined by FFQ and FR. Furthermore, there was a medium-strength correlation ($r_s=0.463 - 0.629$) for the individual PUFA's assessed and there was agreement across the range of intakes between each PUFA and therefore no systematic bias. Medium strength correlations were also found between the FFQ and the RBC membrane PUFAs for total n-3 ($r_s=0.211$), α -linolenic acid (ALA, $r_s=0.314$), eicosapentaenoic acid (EPA, $r_s=0.430$), and docosahexaenoic acid (DHA, $r_s=0.605$) content, yet no correlation with docosapentaenoic acid (DPA) could be shown. Correlations could be improved by adjusting for gender, age, supplement intake and fish consumption. Tertile assignment was able to adequately identify individuals according to their RBC PUFA levels and FFQ intake, with 47% being classified in the same tertile for EPA and 55% for DHA.

Conclusion:

The adapted FFQ is an adequate tool for estimating usual PUFA intakes with the exception of DPA. It can be used in clinical settings to identify individuals with poor intakes who would benefit from n-3 PUFA supplementation or dietary adjustments.