Omega-3 and Omega-6 Fatty Acid Profiles in Select Freshwater and Marine Species of Fish in Suriname

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Pregnant women in Suriname heavily consume predatory freshwater fish species that are often mercury-contaminated. Freshwater fish had lower Ω-3 but higher Ω-6 fats composition compared to marine fish species.

Background:
- The Caribbean Consortium for Research in Environmental and Occupational Health (CCREOH) examines the impact of environmental exposures among mother-child dyads in Suriname.
- One in four CCREOH-mothers had hair mercury levels exceeding the USEPA action level (1.1µg/g), most of whom live in the interior region and depend heavily on fish for dietary protein intake.

Methods:
- Fish dietary questionnaire was used.
- Fatty acid profile in raw dorsal muscle tissue of heavily consumed fish species was measured by total lipid extraction, methylation, using gas chromatography analysis (n=5/species).

Table 1. Summary Statistics of Maternal Fish Consumption (N=1067)

<table>
<thead>
<tr>
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<th>Coastal participants, n (%)</th>
<th>Interior participants, n (%)</th>
<th>Reported to eat fish, n (%)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>906 (85)</td>
<td>161 (15)</td>
<td>1026 (96)</td>
</tr>
<tr>
<td>Eats carnivorous fish species*</td>
<td>681 (64)</td>
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<td>Estimated fish intake per week (in grams)</td>
<td>342 (32-7481)</td>
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*Variable summary statistic is expressed as: median (minimum-maximum)
*Namely: C. ocellaris, S. rhombeus, H. aimara, and P. squamosissimus

Discussion: Nutritional benefit of fish consumption during pregnancy needs to also consider potential risks of prenatal mercury exposure for neurotoxicity.

Figure 1. Omega-3 and Omega-6 Polyunsaturated Fatty Acid in Fish
Composition of Ω-3 (EPA+DHA) and Ω-6 (AA) polyunsaturated fatty acids in eight fish species: scatterplot of individual values expressed as % of total fatty acids. Abbreviations used are arachidonic acid (AA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). In marine fish species there was lower AA (p=0.03), higher EPA+DHA (p<0.0001), and higher EPA+DHA (p<0.0001) content compared to freshwater fish species, according to Mann-Whitney test. No significant difference in AA content across species (p=0.1), but there was significant differences in DHA (p=0.0003) as well as in EPA+DHA; ** indicates species with significant differences compared to C. callichthys according to Dunns test (p<0.01).

Figure 1 Omega-3 and Omega-6 Polyunsaturated Fatty Acid in Fish Composition of Ω-3 (EPA+DHA) and Ω-6 (AA) polyunsaturated fatty acids in eight fish species: scatterplot of individual values expressed as % of total fatty acids. Abbreviations used are arachidonic acid (AA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). In marine fish species there was lower AA (p=0.03), higher EPA+DHA (p<0.0001), and higher EPA+DHA (p<0.0001) content compared to freshwater fish species, according to Mann-Whitney test. No significant difference in AA content across species (p=0.1), but there was significant differences in DHA (p=0.0003) as well as in EPA+DHA; ** indicates species with significant differences compared to C. callichthys according to Dunns test (p<0.01).