An Investigation of the Influence of Fish Oil Supplementation on IL-8: A Possible Protection Against Preeclampsia

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Disclosures

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Learner Objectives:

To understand the role of polyunsaturated fatty acids from fish oil supplementation in the diet

To understand the unique properties of interleukin-8 that may affect the development of preeclampsia

To understand the factors that predict the use of fish oil in pregnancy

To understand the association between fish oil supplementation and serum levels of IL-8 in pregnancy
Disclosures

Conflict of Interest and Commercial Support: None

Employer: Emory University

Sponsorship: T32- “Training in Interventions to Improve Outcomes in Chronic Conditions” (PO1 NR011587)
Disclosures

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“Psychoneuroimmune Contributions to Postpartum Depression”
(R01 NR011278)
PI: Dr. Elizabeth Corwin
Preeclampsia
Preeclampsia

Strikes 10 Million Women Every Year
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76 Thousand Women Die
Preeclampsia

Strikes 10 Million Women Every Year
76 Thousand Women Die
500 Thousand Infants Die
Preeclampsia

Strikes 10 Million Women Every Year
76 Thousand Women Die
500 Thousand Infants Die
7 Times More Likely in a Developing Country
Preeclampsia: A renal perspective

SANANTH KARUMANCHI, SHARON E MAYNARD, ISAAC E STILLMAN, FRANKLIN H EPSTEIN and VIKAS P SUKHATME

Preeclampsia: A renal perspective

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Polyunsaturated Fatty Acids (PUFAs)
Polyunsaturated Fatty Acids (PUFAs)
• Omega 6
Polyunsaturated Fatty Acids (PUFAs)
• Omega 6
• Omega 3
Essential Fatty Acids

Polyunsaturated Fatty Acids (PUFAs)
- Omega 6
- Omega 3
Polyunsaturated Fatty Acids (PUFAs)
- Omega 6
- Omega 3
Polyunsaturated Fatty Acids (PUFAs)

- Omega 6
- Omega 3

Decreased IL-8?
Methods:

• 203 Women in Colorado and Ohio Enrolled
• Longitudinal Study from 3rd Trimester to 6 months Postpartum:
  • This analysis is of the one prenatal time point in the 3rd Trimester
    • Fish Oil Supplementation? Yes/No

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  - Plasma Cytokine levels

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Table 1. Demographic and clinical characteristics of women who did or did not report taking prenatal fish oil supplements (mean ± SD)

<table>
<thead>
<tr>
<th></th>
<th>No (N=116)</th>
<th>Yes (N=40)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>28.1 (5.3)</td>
<td>31.1 (4.2)</td>
<td>p= 0.002**</td>
</tr>
<tr>
<td>BMI</td>
<td>25.1 (5.2)</td>
<td>22.8 (3.4)</td>
<td>p=0.01*</td>
</tr>
<tr>
<td>Married</td>
<td>73%</td>
<td>90%</td>
<td>p=0.05</td>
</tr>
<tr>
<td>Caucasian</td>
<td>67%</td>
<td>93%</td>
<td>p=.002**</td>
</tr>
<tr>
<td>High Income</td>
<td>66%</td>
<td>93%</td>
<td>p=.001**</td>
</tr>
</tbody>
</table>
Table 2. Interleukin-8 plasma levels (pg/ml) in women who did or did not report taking prenatal fish oil supplements (mean ± SE)

<table>
<thead>
<tr>
<th></th>
<th>No (N=108)</th>
<th>Yes (N=40)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFN-γ</td>
<td>0.82 (.05)</td>
<td>1.0 (.09)</td>
<td>NS</td>
</tr>
<tr>
<td>IL-1</td>
<td>0.38 (.03)</td>
<td>0.38 (.08)</td>
<td>NS</td>
</tr>
<tr>
<td>IL-6</td>
<td>1.00 (04)</td>
<td>0.88 (.08)</td>
<td>NS</td>
</tr>
<tr>
<td>TNFα</td>
<td>1.81 (.05)</td>
<td>1.76 (.07)</td>
<td>NS</td>
</tr>
<tr>
<td>IL-8</td>
<td>1.60 (.04)</td>
<td>1.33 (.06)</td>
<td>p=.002**</td>
</tr>
<tr>
<td>IL-10</td>
<td>1.48 (.08)</td>
<td>1.53 (.15)</td>
<td>NS</td>
</tr>
</tbody>
</table>

**FISH OIL USAGE**
Logistic Regression Results:

Performed to assess the impact of 4 factors (age, BMI, Caucasian race or other, Income (food voucher program) on the likelihood a woman would supplement with fish oil in pregnancy.

A full model using these 4 predictors (age, BMI, Caucasian race or other, Income (food voucher program) was statistically significant.

• Chi-square (6, N=188) = 23.43, p<.000
Logistic Regression Results:

Fish oil users were more likely to be older (p<.002*), thinner (p=.01*), Caucasian (p=.002**) and not receiving food vouchers (.001**).

The whole model explained 11.7-17.8% of the variance in fish oil intake and correctly classified 76.6% of cases.
Linear Regression Results:

After controlling for age, BMI, marital status, Caucasian race, and income:

- IL-8 levels were significantly lower among women taking fish oil supplements ($p=0.026^*, t=3.157, df = 145$) compared to those not taking it.

- Fish oil usage explains 5.8% of the variance in prenatal IL-8 plasma levels.
Why are women using Fish Oil and how much are they ingesting?
Could Fish Oil Use Reduce Preeclampsia Risk?
Could IL-8 levels serve as an early marker of preeclampsia?
References


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World Health Organization Fact Sheet, May 2012.