Implementation of Evidence Based Recommendations for Omega 3 Docosahexaenoic Acid (DHA) in Pregnancy
Mary Harris, PhD, RDN
Monday October 5 1:30 - 3:00 pm

Disclosures
Mary Harris, PhD, RDN
- Consultant
  National Fisheries Institute
- Board Member Perinatal Nutrition Group
  Genetic Alliance - Expecting Health
- Research Support
  USDA and Agricultural Experiment Station

Learning Outcomes
- Learning Outcome #3
  At the end of the session, participants will be able to:
  Develop a plan to disseminate evidence-based lifestyle practices for the consumption of omega 3 fatty acids during pregnancy.

Benefits of Seafood and Omega 3 DHA In Pregnancy

<table>
<thead>
<tr>
<th>Maternal benefits</th>
<th>Benefits to Babies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Good evidence: Increase in gestational length</td>
<td>• Strong Evidence: Optimal development of vision and processing of neural signals</td>
</tr>
<tr>
<td>• Strong Evidence: Reduction of early preterm birth</td>
<td>• Strong Evidence: Enhanced cognitive development (motor, social and communication skills and IQ in childhood)</td>
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<tr>
<td>• Strong Evidence: Improved DHA content of breast milk</td>
<td>• Emerging Evidence: Decreased body fat in infancy and childhood</td>
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<tr>
<td>• Emerging Evidence: Prevention and/or management of perinatal depression</td>
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Pregnant women should consume 2 – 3 servings of seafood (4 – 6 oz each) per week

Corresponds to 200 – 2400 mg EPA and DHA/day depending upon fish choice

Maternal Seafood Intake And Pregnancy Outcome

- Recently Reviewed
- Effect of consuming seafood in pregnancy generally exceeds effects of DHA or Fish Oil (FO) supplements

Studies Often Show Maternal Fish Intake But Not Supplements Associated with Improved Outcome

- ↓ Risk Preterm (PT) Birth
  - MFN Progesterone and FO for the Prevention of PT Birth
  - No effect of FO supplements on prevention of PT birth
  - ORadj 0.60 (0.38,0.95)PT Birth in women consuming fish 3 times/w compared to < 1/mo

CSU Omega Smart Baby Study

- 4.5 d increase in gestation (p = .048) and 18% decrease in PT Birth (p=.026) in women consuming > 600 mg DHA/d compared to < 300 mg/d but no effect by supplement group

Why May Fish Intake Be More Effective Than Supplements?

- Stability of LCPUFA in Supplements?
- Synergistic Effect of the Unique Nutrient Bundle in Seafood: Omega 3 DHA, Vitamin D, Selenium, Iron?
- Eating Seafood May Be a Marker for a Healthy Diet?

Issue: Balance Between Omega 3 DHA Benefits and the Known Toxic Effects of Methyl Mercury

- Omega-3 Benefits
  - “What You Need to Know About Mercury in Fish and Shellfish”
  - Advice for Women Who Might Become Pregnant are Pregnant and Nursing Mothers Young Children

Result: Pregnant Women Are Confused

- “Better Safe Than Sorry”

“The Fish Paradox”

Most studies have found that although fish contain MeHg, the positive benefits of fish outweigh any negative effects

- Fish accounts for only 9% of the variance in blood mercury levels (Golding J et al Environ Health Perspect 2014;121:1214)
- Majority of commercially available seafood in the US is considered to be low in MeHg
Fish Consumption By Pregnant Women Below Recommended Levels in the US

- 21% of pregnant women eat no fish
- 75% consume less than 4oz/wk

US FDA and EPA

Australian Study: Adherence to Dietary Guidelines During Pregnancy

- 15% women ↑ seafood in pregnancy
- 24% women made no change
- 22% women ↓ seafood consumption
- 7% women avoided fish

(Malek L et al Public Health Nutr 2013 doi:10.1017/S1368980015002232)

Omega Smart Baby Study: Maternal DHA and Fish Intake (2014)

<table>
<thead>
<tr>
<th></th>
<th>Pregnancy</th>
<th>2 Mo Lactation</th>
<th>4 Mo Lactation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omega 3 DHA (mg/day)</td>
<td>81.9 +/- 5.8</td>
<td>90</td>
<td>99</td>
</tr>
<tr>
<td>Fish (serv/wk)</td>
<td>0.64 +/- .06</td>
<td>0.78 +/- .12</td>
<td>0.94 +/- .17</td>
</tr>
<tr>
<td>Fish (oz/wk)</td>
<td>3.2</td>
<td>3.9</td>
<td>4.7</td>
</tr>
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</table>

We Need to Reconsider How Seafood Messages Are Delivered and Perceived by Pregnant Women

Numerous Reasons Why Pregnant Women Don’t Eat Enough Fish

- Risk Averse
  - Fear of MeHg
- Unaware of Benefits
- Availability/Cost of Fresh Seafood
- Lack Ability to Prepare Fish

Big Question Remains:

How Can We Get Pregnant Women To Eat More Fish?
This project was funded by USDA CREES and AES

Goal: Develop a Nutrition Education Program to Match DHA Supplementation

Two Phases
I. Program Development and Formative Evaluation
   • Focus Groups with Target Audience
   • Education Materials (Developed and Tested)

II. Implementation and Evaluation of Effect
   • WIC Participants / Denver Health Clinic OB Patients
   • Nutrition Education Arm to ↑ DHA by 300 mg/d (n=191)
   • RCT Arm 0, 300, 600 mg DHA/d supplement (n=341)

Phase I: Focus Group Objectives
• Motivators/Barriers to eating during pregnancy
• Customary Omega 3 DHA foods
• Information sources and preferences
• Preferred format for education materials
• Multicultural
  • 8 focus groups (2 in Spanish)
  • 66% Hispanic/Latina; 28% African American

Healthy Foods To Eat During Pregnancy
• In general, participants felt that eating a variety of foods, and a balanced diet was healthy
  “In my house, we eat a variety of everything. It’s all healthy because all foods have different things that are right for your body.”
• Fruits and vegetables
• Protein foods important

Motivators to Eating Healthy In Pregnancy
Primary
• Nutrition and development of a healthy baby
• Specific vitamins and minerals
  • Folic acid, Calcium, DHA

Secondary
• Healthy foods essential to weight gain
• African-American women - avoidance of heartburn
• Spanish Language women - disease prevention
Foods Avoided During Pregnancy

- Food with a high fat content/fried foods
- Fast foods
- Candy/sweets
- (Fewer mentioned) Salty foods or Caffeine

Why avoid?
- Excess weight gain
- Increase disease risk (mom/baby)
- Generally not healthy

Omega-3 DHA Rich Foods Customarily Consumed In Diet of Various Cultural Groups

- Ordinary Eggs
- Canned tuna (7 out of 8 focus groups)
- Sardines, salmon and mackerel (primarily African-American women)

BUT they didn’t consume enough!

Motivators to Consuming More DHA Rich Foods

- Knowledge of the benefits to baby
  “Yes, I will eat it. If they tell me that tuna is good and it will benefit the baby.”
- New and easy ways to prepare the foods

Barriers to Consuming DHA Rich Foods

- Smell and taste
  “I love tuna fish, but if you put it in my face when I am pregnant, you’re gonna get thrown up on.”
- Cost
- Unfamiliar with foods, especially DHA eggs

“What would be a good way of providing information to encourage you to eat more of the foods that contain DHA?”

- Recipes
  “I think ways of preparing the foods maybe with sauces or something that would help them go down easier.”
- Cooking demonstrations
- Coupons or WIC vouchers
  “Maybe if they (Gold Circle™ brand eggs) were on WIC list we would try them because they would be there.”
- Reminders

Theory Based Intervention

- Health Belief Model
  - Increase motivation: information, logo, reminders
  - Decrease barriers: coupons, recipes
  - Perceived susceptibility: recruitment, some calendar information
Recipe Development Criteria

- 300 mg in one serving (2 DHA-enriched Eggs or Fish)
- Quick and easy to prepare
- Wide variety of inexpensive, widely accepted ethnic foods
- Include breakfast, lunch and dinner recipes
- Provide variety of preparation methods
- Well pronounced flavor to disguise the taste/smell of fish

Recipe Development

- Taste Testing
  - Recipes tested by research team
  - Would tester would make the recipe?
  - Should recipe be included in intervention?
  - 3 recipes tested in target population in clinics
  - Used salmon, tuna, sardines
  - 90% thought recipes should be included in intervention
  - Kept 12: 4 egg, 4 salmon, 2 sardine, 2 tuna

Did you know . . .

Docosahexaenoic acid (DHA) is a type of fat that is naturally found in fish and can improve the health of your baby. DHA is a member of the Omega-3 family. These fats are needed for healthy growth of the brain and eyes of your baby and may decrease your risk of having a low birth weight baby.

Where can I find these healthy fats?

DHA can be found in canned pink salmon, mackerel, albacore tuna and other cold water fish. DHA can also be found in special eggs called DHA-rich eggs which can be found at many local grocery stores.

How much of these healthy fats should I eat?

By eating 1-2 of the DHA-rich eggs each day and a serving of fish 2-3 times a week, you should be able to get the 300 mg a day that is recommended.

How can I learn more about Omega-3 fats?

Talk to your nutrition educator at the WIC clinic. If you are in the 13th through 20th week of your pregnancy, you can receive special nutrition education materials to help you understand the importance of Omega-3 fats.

These foods are expensive. How can I afford to eat them?

Canned fish such as albacore tuna, pink salmon and sardines are not expensive. Watch for store specials.

Education Materials

- One Page Information Sheet about Omega-3 DHA
- English and Spanish Versions

Supportive Strategies

- Store coupons for Gold Circle™ brand of DHA-enriched eggs
- Canned fish provided at recruitment
  - salmon, tuna, sardines
- Provided 2 recipes/mo

Education Materials

- 9 month Calendar
  - Backbone of the intervention
  - Explanation of what DHA is
  - Something relevant to mother AND baby targeted to stage of pregnancy
  - Nutrition/health tip of the month
- Stickers
- Personalize calendar (events, appointments, delivery date, etc)
- Recipes
- Magnetic Clip and Recipe Holder with Logo
- Nylon Pouch with dividers for coupons, recipes, shopping lists

Phase II. Intervention and Results
**What Did Pregnant Women Like About Omega-3 for Baby and Me?**

<table>
<thead>
<tr>
<th>Program Component</th>
<th>English Speakers</th>
<th>Spanish Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recipes</td>
<td>9/14 (64%)</td>
<td>12/16 (75%)</td>
</tr>
<tr>
<td>Calendars</td>
<td>11/14 (78%)</td>
<td>9/16 (56%)</td>
</tr>
<tr>
<td>Education Sheet</td>
<td>12/14 (86%)</td>
<td>10/16 (63%)</td>
</tr>
<tr>
<td>Magnets/R. Holder</td>
<td>14/14 (100%)</td>
<td>14/16 (88%)</td>
</tr>
<tr>
<td>Organizer Pouch</td>
<td>11/14 (78%)</td>
<td>11/16 (67%)</td>
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**Behaviors**

<table>
<thead>
<tr>
<th></th>
<th>English Speakers (14)</th>
<th>Spanish Speakers (16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Coupon</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Number Redeemed</td>
<td>~ 2x/mo</td>
<td>10 &gt; 2x/mo</td>
</tr>
<tr>
<td>Ate Eggs</td>
<td>4 (2-4/wk)</td>
<td>8 (4-7/wk)</td>
</tr>
<tr>
<td></td>
<td>7 (&gt; 5/wk)</td>
<td>8 (&gt; 2/d)</td>
</tr>
<tr>
<td>Ate Fish</td>
<td>1-2x/wk</td>
<td>6 (&gt; 1/wk)</td>
</tr>
<tr>
<td></td>
<td>6 (&gt; 2/wk)</td>
<td></td>
</tr>
<tr>
<td>Type of Fish</td>
<td>Tuna &gt; salmon &gt; sardines &gt; Tuna &gt; salmon &gt; sardines &gt; catfish, tilapia</td>
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**Results**

- 4.5 day increase in gestational length with nutrition education to increase DHA intake by 300 mg/d
- 4 day increase in gestational length with 600 mg DHA/d
- Significant Decrease in Early PT Birth (< 34 w)


**Practice Applications**

- Pregnant women do not have adequate knowledge of the benefits of seafood and DHA during pregnancy and lactation
  - Formalized, targeted and theory based nutrition interventions can increase seafood intake among pregnant women and improve outcomes.
  - Most health care professionals recognize the importance of nutrition for pregnant women, but few are well informed about seafood issues
  - Dietitians can be instrumental in dissemination of clear and compelling advise about seafood in pregnancy to obstetricians and other obstetric care professionals.

**Acknowledgements**

Omega 3 For Baby and Me Research Colleagues

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Marsha Wheeler, MD

For CD containing Omega 3 for Baby and Me Materials Contact: mary.harris@colostate.edu

Thank You! Questions?