ALASKA SEAFOOD AND HEALTHY MOMS AND BABIES

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TABLE OF CONTENTS

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Dietary fat intake during pregnancy and lactation has a significant impact on pregnancy outcomes and child growth, development and health. General recommendations for fat intake for pregnant and lactating women remain consistent with those for the general adult population, except for an increase in the recommendations for consumption of omega-3 polyunsaturated fatty acids. The increased need for omega-3 fatty acids is because docosahexaenoic acid (DHA) is the predominant fat found in the brain and central nervous system, making up over 90% of the omega-3 fatty acids in the brain, [7] affecting neurocognitive development. Both eicosapentaenoic acid (EPA) and alpha-linolenic acid (ALA) are present, but only in minimal quantities.

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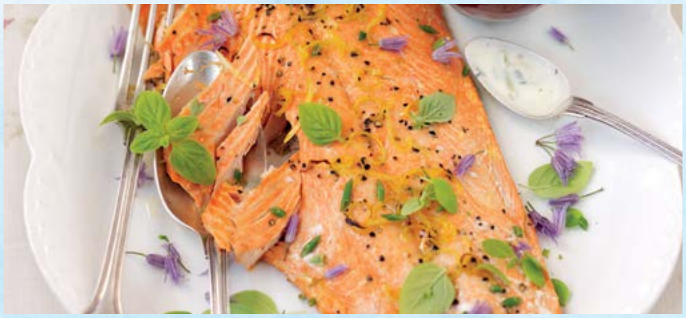
DHA IN PREGNANCY

DHA is rapidly accumulated in the brain during pregnancy and in early infancy through breastmilk. Half of the brain's DHA accumulates during pregnancy [7], with accretion being highest during the last trimester at 30-45 mg per day. [2,3]

The quantity of DHA in a mother's diet determines the amount of DHA available to be transferred to a fetus or infant.

Increased availability of DHA from the mother enhances supply to the fetus and leads to higher DHA concentration in cord blood or infant blood levels [4]. A higher DHA supply to the fetus during pregnancy and to the infant after birth provides maximum benefits on the development of visual acuity, cognitive functions and attention, the maturity of sleep patterns, spontaneous motor activity, and immunity. [1]



Breastfeeding

THE IMPORTANCE OF ADEQUATE DHA OBTAINED FROM MOTHER'S MILK CANNOT BE OVERLOOKED AS THERE ARE SPECIFIC BRAIN-RELATED BENEFITS IN INFANTS.

These include a better ability to adjust to changes in surroundings, better mental development, improved hand-eye coordination, better attention scores and memory performance later in life. [7] The amount of DHA available to a breastfeeding infant is directly related to the amount available in breastmilk. If a mother's diet is deficient in DHA, supply to the infant will be suboptimal. Also, the duration of breastfeeding and the greater total volume of breastmilk throughout an infant's life impact total DHA accretion in the brain and increase cognitive benefits. [24] Additionally, studies have demonstrated that DHA levels are higher in breastfed infants, compared to formula-fed infants. [13]

BEHAVIOR

THE AMOUNT OF OMEGA-3 FATTY ACID AVAILABILITY DURING PREGNANCY AND THROUGHOUT LIFE IMPACT NEUROBEHAVIORAL DEVELOPMENT INCLUDING ANXIETY AND SOCIAL BEHAVIORS.

Additionally, higher blood levels of DHA have been an area of growing interest for a nonpharmacological intervention for children with ADHD. Improvement in ADHD behaviors is associated with the impact that omega-3 fatty acids play on inflammation in the brain, as well as changes in gut microbiota composition affecting the gut-brain axis. [27, 28]

COGNITION

The supply of DHA to the brain's frontal and prefrontal lobes is essential because the frontal lobe of the brain is responsible for executive and higher-order cognitive activities including sustained attention, planning and problem-solving. [8] The pre-frontal lobe is responsible for social, emotional and behavioral development. [9]

The provision of DHA through breastmilk, diet or supplementation during the first year of life leads to enhanced cognitive development, improved processing speed, working memory and executive function later in life. [25,26]

Studies, where boys ages 6-12 had lower blood levels of omega-3 fatty acids, were correlated with a high number of learning and behavior problems. [14] Additional studies have demonstrated improvements in verbal learning, spelling, reading, and executive function with supplementation of DHA. [15, 16]

ASTHMA AND ALLERGIES

Consumption of omega-3 fatty acids through seafood and fish oil supplements reduces inflammation and has a positive impact on the body's immune response.

This has been associated with a reduced number of food allergies and atopic dermatitis in infants' birth to 12 months of age. Additionally, fish oil supplementation in children leads to changes in immune function and decreases the risk of developing other allergies and asthma. Ongoing studies are needed in this area but are very promising to date. [30]

Vision Omega-3 fatty acids are believed to affect visual acuity and development in infants and are therefore essential for the development of normal vision. Accretion of DHA takes places at highest levels during the third trimester of pregnancy, and because of this, infants born prematurely are at risk for the development of retinopathy of prematurity. Evidence is strong that **DHA HAS PROTECTIVE BENEFITS FOR OPTIMAL VISION DEVELOPMENT IN BOTH PREMATURE INFANTS AND INFANTS OF NORMAL GESTATION. [23]**

PREMATURE BIRTH

Preterm birth (babies born before 37 weeks of pregnancy) accounts for 85% of all perinatal complications and death, and globally is the leading cause of death in children under the age of 5. [21] Approximately 50% of all preterm births have unknown or unclear causes, but the consequences of a child being born too soon range both short and long term. Infections or inflammation contribute to the most common disease of immaturity including bronchopulmonary dysplasia, retinopathy of prematurity, necrotizing enterocolitis and white matter injury of the brain. Since most of the accretion of omega-3 fatty acids occurs in the third trimester of pregnancy, infants born prematurely are at high risk for developing a deficiency of omega-3 fatty acids. Inadequate levels of DHA place premature infants at risk for cognitive, visual and neurological deficits in the long term. [21]

Provision of DHA and EPA may reduce the incidence or severity of the most common comorbidities of prematurity by enhancing immune and anti-inflammatory responses. [21]

Studies have also demonstrated that supplementation or adequate intake of omega-3 fatty acids during pregnancy can reduce the chances of preterm birth and increases the duration of pregnancy. [22]

MATERNAL DEPRESSION

Women who are of childbearing years are vulnerable to depression and being pregnant or giving birth precipitates postpartum depression in some women. Perinatal depression can result in psychosocial dysfunction, suicide, and adverse childcare. [19]

Increased rates of depression are found in women who have an inadequate amount of omega-3 in their blood as omega-3 fatty acids affect neurotransmission and deficiency creates neuro-inflammation in the brain. [17]

Additionally, omega-3 fatty acids in a woman's diet may attenuate maternal psychosocial stress and reduce rates of depression by supporting a positive mood and altering perceived stress and anxiety. [18] Studies have shown that nutrition interventions through increase intake of foods high in omega-3 fatty acids can be effective for perinatal depression. [20] Supplementation of omega-3 fatty acids or **intake of foods sources such as 4 ounces of omega-3 rich wild Alaska seafood twice a week are recommended.**

MERCURY IN SEAFOOD

Although consuming fish is an effective strategy to ensure adequate intake of omega-3 fatty acids for pregnant women, breastfeeding women, and children, the predominant drawback is that some species of fish contain methylmercury. Methylmercury is undetectable by humans but is toxic to the developing brain of a baby and may adversely affect child growth. Mercury contamination occurs in oceans, river and other bodies of water.

Levels of bioaccumulated contaminants, such as mercury, tend to be highest in larger predatory fish, [5] with the highest amounts found in shark, tilefish, swordfish and king mackerel. Since concerns about methylmercury in seafood have arisen, there has been a decline in fish consumption among pregnant women. [29]

Studies have demonstrated

that high fish intake by pregnant women can lead to high infant cognition, verbal intelligence, pro-social behavior, fine motor, communication, and social development score. [5,6]

Because of this, it has been determined that the advantages of consuming seafood, outweigh potential risk associated with mercury contamination [1]. Women should select fish that are known to be lower in levels of methylmercury such as wild Alaska salmon, sablefish, and herring. In addition to these species possessing low levels of mercury,

Wild Alaska seafood also naturally contains selenium, an element which prevents mercury from interacting with tissues and minimizing if not eliminating mercurial risks.

RECOMMENDATIONS:

Studies have shown that the consumption of seafood is one of the best ways to ensure adequate intake of DHA for mothers and infants.

A large study (N = 11,875) showed that lower seafood intake resulted in suboptimal infant development. In contrast, children whose mothers had a high seafood intake during pregnancy, demonstrated excellent pro-social behavior, better fine motor development, and high verbal intelligence at eight years of age. [12] Benefits were also seen in supplementation with DHA.

For mothers who are considering increasing seafood consumption while pregnant or breastfeeding, the recommendations call for the inclusion of wild alaska seafood such as salmon, sablefish, herring, and cod, as these are excellent sources of beneficial DHA.

Omega-3 fatty acids are found in a limited number of food sources. The most significant sources of DHA in our diets is oily fish such as wild Alaska salmon, sablefish, herring, and cod. Other sources of omega-3 fatty acids include omega-3 enriched eggs. Food such as flaxseeds contains a type of fatty acid called alpha-linolenic acid, ALA, which is not easily converted to DHA.

UNFORTUNATELY, THE INTAKE OF OMEGA-3 FATTY ACIDS RARELY MEETS THE RECOMMENDED AMOUNTS AND IS INADEQUATE IN MOST PEOPLE'S DIET DUE TO THE DECREASED CONSUMPTION OF SEAFOOD. Low consumption is especially true for pregnant and breastfeeding mothers, as well as children.

To ensure optimal development of the brain, eye nervous system and immune system in their growing child, and decrease their risk of perinatal depression,

A PREGNANT AND LACTATING WOMAN SHOULD AIM TO ACHIEVE AN AVERAGE DIETARY INTAKE OF AT LEAST 200 MG DHA PER DAY. CONSUMING 4-OUNCES OF FATTY FISH TWICE PER WEEK WILL HELP WOMEN TO ACHIEVE THIS GOAL.

The evidence for recommendations for DHA consumption by children is still emerging; however, current guidelines range from 250 to 500 mg EPA + DHA per day. [10, 11]

The increased intake of wild Alaska seafood during pregnancy and the early years of life extended beyond the contribution of critical omega-3 fatty acids. Wild Alaska seafood is also nutrient-dense food sources that contribute to protein, vitamin D, selenium, potassium and B vitamins to the diet. All of these are essential nutrients for human health and development.

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