

Omega-3 Fatty Acid Supplementation During Pregnancy

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FROM ABSTRACT:

Omega-3 fatty acids are essential and can only be obtained from the diet.

The requirements during pregnancy have not been established, but likely exceed that of a nonpregnant state.

Omega-3 fatty acids are critical for fetal neurodevelopment and may be important for the timing of gestation and birth weight as well.

Most pregnant women likely do not get enough omega-3 fatty acids because the major dietary source, seafood, is restricted to 2 servings a week.

For pregnant women to obtain adequate omega-3 fatty acids, a variety of sources should be consumed: vegetable oils, 2 low-mercury fish servings a week, and supplements (fish oil or algae-based docosahexaenoic acid).

THESE AUTHORS ALSO NOTE:

“In the field of perinatal nutrition, polyunsaturated fatty acids (PUFAs) of the omega-3 and omega-6 groups have gained recent attention because of their important functions in fetal and newborn neurodevelopment and because of their roles in inflammation.”

Both arachidonic acid (AA) and docosahexaenoic acid (DHA) are critical to fetal and infant central nervous system (CNS) growth and development.

DHA is involved in visual and neural function and neurotransmitter formation.

During the last trimester, the fetus requires at least 50-70 mg a day DHA.

Babies require high DHA for their CNS up until about 18 months of age.

Omega-3 and omega-6 fatty acids cannot be synthesized by the body.

“All of the omega-3 and omega-6 fatty acids accumulated by the fetus must ultimately be derived from the mother by placental transfer.”

“The typical American diet is replete with omega-6 fatty acids, particularly linoleic acid, which is readily converted to AA.”

Omega-6 fatty acids are found in the vegetable oils used in processed foods, fried foods, and condiments like salad dressings.

“One teaspoon of corn oil can satisfy the daily omega-6 requirement, but most individuals eat 10 to 20 times that amount.”

The intake of omega-3 fatty acids is less than optimal.

“The richest dietary sources of omega-3 fatty acids are from marine sources, fish oil supplements, and selected vegetable oils like flaxseed (57% omega-3), canola (11% omega-3), and soybean (8% omega-3).”

“The ratio of dietary omega-6/omega-3 fatty acids in the American diet approximates 10 to 25:1; the Paleolithic diet was probably closer to 1:1.”

Both the omega-3 fatty acid EPA and the omega-6 fatty acid AA are essential structural components of every cell in the body.

A balanced intake of omega-6 and omega-3 fatty acids reduces inflammation and improves immunity.

Both DHA and AA are essential to fetal CNS development.

A high ratio of AA to EPA can cause preterm labor and preeclampsia.

“A linoleic acid-rich diet produces an abundance of AA, which serves as a precursor of the potent 2-series prostaglandins (PGs) E2 and PGF2, and the vasoconstrictor thromboxane (TX) A2.”

In pregnancy, the real significance of EPA may be related to its role in mediating DHA and AA concentrations across the placenta.

Higher maternal EPA concentrations increase the transfer of DHA across the placenta into the fetal circulation. **[Very Important]**

“Because only about 4% to 11% of DHA is retroconverted to EPA, pregnant women who just take DHA supplements, without any dietary EPA, may be unable to produce the right balance of eicosanoids and may limit the transport and uptake of DHA into fetal cells.” **[Very Important]**

Studies show that women with more omega-3 fatty acids and less omega-6 fatty acids in their diets delivered babies that were heavier and had longer gestations, both beneficial to the baby’s health.

Researchers determined that fetal gestation and fetal benefits could be achieved by supplementing with 2700 mg/d of EPA (1780 mg) + DHA (920) in the ratio of 1.93/1 [essentially 2/1].

Also, the children of women supplementing with 2700 mg/day while pregnant and breast feeding had higher mental processing scores at age 4 compared to the children of mothers who did not so supplement. Similar studies showed that the supplemented children also had improved scores for eye and hand coordination.

"The time of the most rapid neural and retinal development occurs in the second half of pregnancy, mainly during the third trimester. On this basis, supplementation of the maternal diet later in pregnancy with omega-3 fatty acids, especially DHA, was thought to be especially important."

There is an essential need for omega-3 PUFAs during pregnancy. "Yet, the typical Western diet is notably deficient with respect to them."

"Women consuming less than 150 mg of omega-3 fatty acids a day (ie, less than 0.5 oz of fish per day) were at the highest risk of delivering prematurely. Of those who ate no seafood and did not use fish oil supplements, the rate of preterm delivery was 7.1%, compared with 1.9% in those who regularly ate fish."

"Although seafood is a good source of both DHA and EPA, concerns about mercury contamination have led to both fear and confusion about whether to recommend it during pregnancy. Both the Environmental Protection Agency and The American College of Obstetricians and Gynecologists recommend that women consume 12 ounces of seafood per week from low-mercury species."

"Children born to mothers eating more than 2 weekly servings of fish performed better on language and visual and motor tests at 3 years of age compared with children born to mothers who ate less than this amount."

"For those seeking to avoid seafood, there are few nonsupplement options. Plant-based omega-3 fatty acids (ie, alpha-linolenic acid [ALA]), like flaxseed oil, are poorly converted to the biologically active omega-3 fatty acid EPA, and converts even less to DHA."

"The range of conversion of ALA to EPA is generally between 0.2% and 9%."

"Trying to obtain all omega-3 fatty acids from plant-based oils requires ingestion of too many fat calories."

"It is impossible for pregnant women to meet their omega-3 fatty acid requirements from omega-3-rich vegetable oils."

"Pregnant women are left with essentially 2 choices: fish oil supplements supplying EPA and DHA, or algae-derived DHA."

"Cod liver oil is considered a less desirable source of EPA and DHA, because it is also rich in vitamin A, unlike other fish oils. Long-term use of vitamin A has been associated with an increased risk of osteoporosis."

Vegetarian sources of DHA are essentially limited to algae derived DHA.

Vegetarian DHA is derived from a strain of algae, *Cryptocodinium cohnii*, which is a naturally high producer of DHA. However, "the oils do not contain any EPA and data demonstrating the benefits in pregnancy of DHA alone are lacking."

"There is little doubt that pregnant women need at least as many omega-3 fatty acids as nonpregnant women, and likely need more DHA."

Dietary omega-3 fatty acids should be adopted at the onset of pregnancy, and there may be benefits for all women who are considering becoming pregnant.

Pregnant women will need to consume omega-3 fatty acids from 3 sources:

- 1) Vegetable oils, like flax seed oil
- 2) Two servings of seafood per week
- 3) Omega-3 fatty acid supplements containing EPA and DHA or DHA alone

"Intake of omega-6-rich oils found in sunflower, corn, and cottonseed oils should be minimized because they are converted to substrates that compete with EPA."

KEY POINTS FROM DAN MURPHY

- 1) Omega-3 fatty acids are essential and can only be obtained from the diet.
- 2) Pregnant women have an increased requirement for omega-3 fatty acids.
- 3) "Omega-3 fatty acids are critical for fetal neurodevelopment."
- 4) "Most pregnant women likely do not get enough omega-3 fatty acids because the major dietary source, seafood, is restricted to 2 servings a week."
[because of mercury and other toxins]
- 5) "For pregnant women to obtain adequate omega-3 fatty acids, a variety of sources should be consumed: vegetable oils, 2 low-mercury fish servings a week, and supplements (fish oil or algae-based docosahexaenoic acid)."
- 6) Both arachidonic acid (AA) and docosahexaenoic acid (DHA) are critical to fetal and infant central nervous system (CNS) growth and development.
- 7) DHA is involved in visual and neural function and neurotransmitter formation.
- 8) During the last trimester, the fetus requires at least 50-70 mg a day DHA.
- 9) Babies require high DHA for their CNS up until about 18 months of age.
- 10) "All of the omega-3 and omega-6 fatty acids accumulated by the fetus must ultimately be derived from the mother by placental transfer."

- 11) "The typical American diet is replete with omega-6 fatty acids, particularly linoleic acid, which is readily converted to AA." These omega-6 fatty acids are found in the vegetable oils used in processed foods, fried foods, and condiments like salad dressings.
- 12) "One teaspoon of corn oil can satisfy the daily omega-6 requirement, but most individuals eat 10 to 20 times that amount."
- 13) The intake of omega-3 fatty acids is less than optimal. The richest dietary sources of omega-3 fatty acids are from marine sources and fish oil supplements.
- 14) "The ratio of dietary omega-6/omega-3 fatty acids in the American diet approximates 10 to 25:1; the Paleolithic diet was probably closer to 1:1."
- 15) A balanced intake of omega-6 and omega-3 fatty acids reduces inflammation and improves immunity.
- 16) "A linoleic acid-rich diet produces an abundance of AA, which serves as a precursor of the potent 2-series prostaglandins (PGs) E2 and PGF2, and the vasoconstrictor thromboxane (TX) A2."
- 17) In pregnancy, the real significance of EPA may be related to its role in mediating DHA and AA concentrations across the placenta. **[Important]**
- 18) Higher maternal EPA concentrations increase the transfer of DHA across the placenta into the fetal circulation. **[Very Important]**
- 19) "Because only about 4% to 11% of DHA is retroconverted to EPA, pregnant women who just take DHA supplements, without any dietary EPA, may be unable to produce the right balance of eicosanoids and may limit the transport and uptake of DHA into fetal cells." **[Very Important]**
- 20) Women with more omega-3 fatty acids and less omega-6 fatty acids in their diets delivered babies that were heavier and had longer gestations, both beneficial to the baby's health.
- 21) Researchers determined that fetal gestation and fetal benefits could be achieved by supplementing with 2700 mg/d of EPA (1780 mg) + DHA (920) in the ratio of 1.93/1 [essentially 2/1]. **[Important]**
- 22) The children of women supplementing with 2700 mg/day while pregnant and breast feeding had higher mental processing scores at age 4 compared to the children of mothers who did not so supplement. Similar studies showed that the supplemented children also had improved scores for eye and hand coordination.
- 23) There is an essential need for omega-3 PUFAs during pregnancy. "Yet, the typical Western diet is notably deficient with respect to them."

- 24) "Although seafood is a good source of both DHA and EPA, concerns about mercury contamination have led to both fear and confusion about whether to recommend it during pregnancy. Both the Environmental Protection Agency and The American College of Obstetricians and Gynecologists recommend that women consume 12 ounces of seafood per week from low-mercury species."
- 25) "Children born to mothers eating more than 2 weekly servings of fish performed better on language and visual and motor tests at 3 years of age compared with children born to mothers who ate less than this amount."
- 26) "For those seeking to avoid seafood, there are few nonsupplement options. Plant-based omega-3 fatty acids (ie, alpha-linolenic acid [ALA]), like flaxseed oil, are poorly converted to the biologically active omega-3 fatty acid EPA, and converts even less to DHA."
- 27) "The range of conversion of ALA to EPA is generally between 0.2% and 9%."
- 28) "Trying to obtain all omega-3 fatty acids from plant-based oils requires ingestion of too many fat calories."
- 29) "It is impossible for pregnant women to meet their omega-3 fatty acid requirements from omega-3-rich vegetable oils." "Pregnant women are left with essentially 2 choices: fish oil supplements supplying EPA and DHA, or algae-derived DHA."
- 30) "Cod liver oil is considered a less desirable source of EPA and DHA, because it is also rich in vitamin A, unlike other fish oils. Long-term use of vitamin A has been associated with an increased risk of osteoporosis."
- 31) Vegetarian sources of DHA are essentially limited to algae derived DHA. Vegetarian DHA is derived from a strain of algae. However, "the oils do not contain any EPA and data demonstrating the benefits in pregnancy of DHA alone are lacking."
- 32) "There is little doubt that pregnant women need at least as many omega-3 fatty acids as nonpregnant women, and likely need more DHA."
- 33) Pregnant women will need to consume omega-3 fatty acids from 3 sources:
A) Vegetable oils, like flax seed oil
B) Two servings of seafood per week
C) Omega-3 fatty acid supplements containing EPA and DHA or DHA alone
- 34) "Intake of omega-6-rich oils found in sunflower, corn, and cottonseed oils should be minimized because they are converted to substrates that compete with EPA."