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Omega-3 Consumption During Pregnancy to Support Optimal Outcomes

Michelle P. Judge Q11

ABSTRACT

Long-chain omega-3 polyunsaturated fatty acids (n-3 LCPUFA), including docosahexaenoic acid, are components of cellular membranes that affect biological functioning. Most pregnant women consume inadequate amounts of n-3 LCPUFA and inadequately convert linolenic acid into docosahexaenoic acid. The purpose of this article is to educate nursing professionals on the importance of n-3 LCPUFA consumption during pregnancy and highlight the critical role of nursing professionals in supporting optimal consumption for improved metabolic, antioxidant, and anti-inflammatory potential.

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Omega-3 fatty acids are generally well accepted as beneficial to health and health outcomes. It is especially important that nurses who care for pregnant women are able to differentiate between food sources of omega-6 and omega-3 fatty acids and across different types of omega-3 fatty acids, including linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). Therefore, the purpose of this article is to educate nursing professionals on the importance of omega-3 long-chain polyunsaturated fatty acid (n-3 LCPUFA) consumption during pregnancy and to highlight their critical role in support of optimal consumption. In this article I provide fundamental knowledge that serves as a basis to optimize educational strategies in nursing through discussion of fatty acid classifications, food sources, consumption recommendations, and associated implications for clinical outcomes in the obstetric population.

A search was conducted to identify the current literature regarding omega-3 knowledge, attitudes, and recommendation practices of nurses. I searched the PubMed database for articles published between 2000 and 2017. Search terms included *nursing practice, knowledge, attitudes, prescribing, omega-3, prenatal recommendations,* and *obstetrics.* I found no related articles. This gap in the literature reflects a need for a formalized needs assessment of the attitudes, knowledge, and recommendation patterns of nurses in relation to dietary n-3 LCPUFA. As an initial step, in this article I provide nurses with fundamental information with which to build a knowledge base about the clinical significance and key considerations that surround n-3 LCPUFA consumption during pregnancy.

Overview of Dietary Fats

Contrasting Saturated and Unsaturated Fats

Most dietary fats are in the form of triglycerides, which comprise a glycerol backbone and three fatty acids. The composition of fatty acids in triglycerides is dependent on the food source and varies widely. Once triglycerides undergo digestion, absorption, and eventual transport, fatty acids are cleaved for use by tissue or incorporated into cellular membranes. Fatty acids differ in structure, and an abundance of a particular type can affect cellular membrane structure and function. Fatty acids considered to be beneficial to health that promote optimal membrane function are commonly referred to as *unsaturated.* In contrast, the potentially problematic fatty acids that impede membrane function are classified as *saturated* fats. In brief, fatty acids are classified by the number of carbons along the fatty acid chain, the degree of saturation representative of the number of carbon Q2 double bonds, and the positioning of these double bonds along the fatty acid chain.

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Most pregnant women consume inadequate long-chain omega-3 polyunsaturated fatty acids for optimal pregnancy outcomes.

Fatty acids are classified as saturated if there is an absence of double bonds along the fatty acid chain; this causes a fatty acid chain that is more saturated with hydrogen. In contrast, unsaturated fatty acids that contain double bonds require less hydrogen to stabilize the carbons along the fatty acid chain, and they are classified as *monounsaturated* (one double bond) or *polyunsaturated* (two or more double bonds; Gropper & Smith, 2013). Omega-3 and omega-6 fatty acids are two major classes of polyunsaturated fatty acids, and they differ with regard to the position where the first double bond appears along the fatty acid chain. Fatty acids with the first double bond appearing on the third carbon are classified as omega-3, and those with the first double bond appearing on the sixth carbon are classified as omega-6. Given that humans cannot synthesize fatty acids with double bonds on the third or sixth carbon and that we must obtain a dietary source to prevent deficiency, omega-3 and omega-6 fatty acids are considered essential fatty acids.

LCPUFA Biosynthesis

Once consumed, the precursors linolenic acid (omega-3) and linoleic acid (omega-6) undergo biosynthesis whereby they are further elongated (i.e., additional carbons are added to the fatty acid chain) and desaturated through forming additional double bonds to the chain to synthesize more bioactive forms involved in cellular membrane function and signaling (Gropper & Smith, 2013). As outlined in Table 1, eicosapentaenoic acid and DHA, two bioactive forms, are longer-chain derivatives of the 18-carbon omega-3 precursor linolenic acid and are referred to herein as n-3 LCPUFA. Arachidonic acid is a longer-chain derivative of the 18-carbon omega-6 precursor linoleic acid. In general, EPA, DHA, and arachidonic acid are all considered long-chain polyunsaturated fatty acids and are further characterized by their omega-3 or omega-6 classification.

Types of Omega-3 Fatty Acids

Dietary sources of omega-3 fatty acids are not equivalent based on the length of the fatty acid chain and number of double bonds. ALA, obtained in flaxseed, soy, and canola, is the metabolic precursor to n-3 LCPUFA and once consumed requires further elongation and desaturation to produce a form that is bioactive. Bioactive n-3 LCPUFA, and not the shorter-chain precursors, are essential to mediate inflammation, oxidation, and neurotransmission (Dyall, 2015). The bioactive products of fatty acid biosynthesis are the n-3 LCPUFAs DHA and EPA. Although DHA and EPA can be synthesized by the body, foods such as fish contain DHA and EPA and are referred to as preformed sources. Pregnant women should be advised to consume a preformed source of DHA because of limited biosynthesis or formation by the body from the shorter-chain precursor that limits the ability to meet increased rates of placental maternal–fetal transfer and fetal use of DHA during pregnancy (Calder, 2016).

Table 1: Comparison of Omega-3 and Omega-6 Fatty Acids by Chain Length

Shorter-Chain Polyunsaturated Fatty Acid (18-carbon chain)	Long-Chain Polyunsaturated Fatty Acid (20 or more carbons on chain)
Omega-3	Omega-3
Linolenic acid (ALA)[a]	Eicosapentaenoic acid (EPA)[b]
	Docosahexaenoic acid (DHA)[b]
Omega-6	Omega-6
Linoleic acid (LA)	Arachidonic acid (AA)

[a]Found in plant oils. [b]Found in fish oil.

Limited biosynthesis is explained in part by diets laden with processed foods and corn oil that cause high circulating levels of omega-6 fatty acids. Omega-6 and omega-3 fatty acids compete for the same enzymes in their respective biosynthetic pathways. Overconsumption of omega-6 fatty acids can result in mobilization of enzymes that can impede n-3 LCPUFA biosynthesis. Hence, reduced desaturation and elongation of omega-3 precursors is impeded because of competition of the omega-6 biosynthetic pathway for similar enzymes necessary for the omega-3 biosynthetic pathway (Calder, 2016). In addition to biosynthetic limitations, preformed n-3 LCPUFA is a preferred source because of a predominant maternal–fetal transfer of DHA and associated bioactivity compared with other fatty acids during pregnancy (Calder, 2016).

Researchers report a link between n-3 LCPUFA and maternal and fetal health outcomes; however,

consumption is inadequate for most women during pregnancy (Innis & Elias, 2003; Loosemore, Judge, & Lammi-Keefe, 2004; Nochera, Goossen, Brutus, Cristales, & Eastman, 2011). Fish and seafood are primary preformed dietary sources of n-3 LCPUFA, but women may have aversion to fish or concerns about contamination and the potential for adverse outcomes. Furthermore, accessibility issues including cost and location can influence fish and seafood consumption patterns. Although multiple factors influence dietary n-3 LCPUFA consumption, health information and recommendations provided during routine care may influence dietary behaviors of women during pregnancy. Omega-3 fatty acids, specifically n-3 LCPUFAs such as DHA, incorporated into membrane phospholipids in neural cells and peripheral cells, influence structure, function, cell signaling, communication, and gene expression (Calder, 2016; Lauritzen et al., 2016).

Infant and Maternal Outcomes

Poor dietary n-3 LCPUFA consumption and/or processing have been linked with adverse infant and maternal outcomes, including preterm birth, gestational diabetes, obesity, preeclampsia, and postpartum depression (Calder, 2016).

Preterm Birth

Related to preterm birth, n-3 LCPUFAs are highly bioactive and play an integral role in the modulation of prostaglandin production, which affects the timing of parturition. Prostaglandins are important to uterine smooth muscle contraction and cervical ripening in labor and birth. Prostaglandins classified as *2-series* are produced to facilitate the birth process. Dietary fat composition can augment prostaglandin production with diets that have greater levels of n-6 LCPUFAs favoring 2-series prostaglandin production. In contrast, greater consumption of n-3 LCPUFAs facilitates the production of 3-series prostaglandins. If production of n-6 LCPUFA–derived 2-series prostaglandins are produced at a level that is too high, with a low level of n-3 LCPUFA–derived 3-series prostaglandins, cervical ripening can occur prematurely, leading to preterm birth (Makrides & Best, 2016).

In contrast, a high level of n-3 LCPUFA–derived 3-series prostaglandins prolong the gestational period and have been associated a reduced risk for preterm birth (Kar, Wong, Rozozinska, & Thangaratinam, 2016; Makrides & Best, 2016).

Nurses who work in obstetrics are uniquely positioned to influence the dietary behaviors of pregnant women.

In two recent meta-analyses, researchers supported the role of n-3 LCPUFA during pregnancy in the reduction of the risk associated with preterm birth. Makrides and Best (2016) combined results from an extant Cochrane review and several large trials and concluded that evidence to date consistently showed that n-3 LCPUFA supplementation during pregnancy increased the mean duration of gestation by 2 days. Furthermore, n-3 LCPUFA supplementation was associated with a 40% to 50% reduction (relative risk = 0.60; 95% confidence interval [0.44, 0.81]) in early preterm birth (<34 weeks gestation; Makrides & Best, 2016). These findings were corroborated in another meta-analysis in which Kar et al. (2016) reviewed six studies on the effects of omega-3 fatty acids on early preterm birth. Consumption of omega-3 fatty acids reduced the risk of early preterm birth by 58% (relative risk = 0.42; 95% confidence interval [0.27, 0.66]) and preterm birth (<37 weeks gestation) by 17% (relative risk = 0.83; 95% confidence interval [0.70, 0.98]). Consumption of omega-3 was also associated with significantly longer mean gestation and greater mean birth weight compared with controls (Kar et al., 2016). In addition, Christian et al. (2016) found that African American women were susceptible to increased risk for preterm birth and lower rates of n-3 LCPUFA consumption, which highlights a need for strategies to target these women.

Inflammation

The antioxidant and anti-inflammatory potential of n-3 LCPUFA has important implications for obstetric disorders, specifically gestational diabetes mellitus (GDM; Judge, Casavant, Dias, & McGrath, 2016), obesity (Vidakovic et al., 2016), and preeclampsia (Rani, Wadhwani, Chavan-Gautam, & Joshi, 2016). In each instance, evidence suggested that greater n-3 LCPUFA consumption resulted in better maternal and fetal outcomes compared with cohorts with suboptimal consumption. Likewise, Leghi & Muhlhausler (2016) investigated reduced n-3 LCPUFA transfer through the placenta related to these disorders. Given that n-LCPUFA are highly bioactive, once incorporated into the cellular membrane, they modulate inflammatory signaling pathways through the production of key anti-inflammatory mediators (e.g., resolvins,

protectins, and maresins) involved in down-regulating the inflammatory response (Calder, 2016). Collectively, in these high-risk pregnancies, less anti-inflammatory n-3 LCPUFA consumption results in a greater inflammatory load and oxidative stress associated with greater maternal symptom severity and infant outcomes that include infant adiposity, jaundice, and need for extended hospitalization (Saccone, Saccone, & Berghella, 2016).

Gestational diabetes. The heightened oxidative and inflammatory state in GDM is associated with reduced maternal–fetal n-3 LCPUFA transfer, which results in significantly greater levels of maternal n-3 LCPUFA and lower levels of umbilical venous DHA (Judge et al., 2016). In pregnancies complicated by diabetes, altered fuel metabolism is associated with alterations in placental n-3 LCPUFA metabolism. Hence, GDM compromises the availability of n-3 LCPUFA to the developing fetus. Reduced availability of n-3 LCPUFA, particularly DHA, during fetal development is a concern because of its central role in neuronal cell membrane function affecting membrane fluidity, neurotransmitter release, gene expression, and neural cellular differentiation and growth (Calder, 2016). Ultimately, low availability of DHA may place infants at risk for altered cognitive and visual development (Calder, 2016). In the general population, researchers reported robust evidence to support better infant cognitive outcomes and attention in childhood related to maternal n-3 LCPUFA consumption (Jacobson et al., 2008; Jiao et al., 2014; Judge, Harel, & Lammi-Keefe, 2007; Ramakrishnan et al., 2016); however, others have reported no difference in cognitive outcomes, warranting further investigation (Gould et al., 2017).

It is currently unclear whether supplementation with DHA at greater dose levels could effectively improve maternal–fetal DHA transfer. In a recent investigation, women with GDM who received omega-3 and vitamin E supplements had greater antioxidant capacity, lesser inflammation state, and lesser incidence of newborn jaundice (Jamilian et al., 2017). However, further investigation is necessary to evaluate whether altered fuel metabolism is the mechanism behind inadequate DHA transfer or if epigenetic interactions affect the ability of a fetus to form triglycerides, composed of three fatty acids, and use them for energy.

Obesity. Obesity during pregnancy is associated with risk for adiposity (obesity) and cardiovascular and metabolic diseases in offspring (Lemas et al., 2015). Reduced n-3 LCPUFA uptake across the placenta and maternal–fetal transfer have been reported in obese pregnant women (Dube et al., 2012). Supplementation with n-3 LCPUFA in obese women during pregnancy improved maternal–fetal n-3 LCPUFA transfer (Calabuig-Navarro et al., 2016). Lesser maternal n-3 LCPUFA concentrations during pregnancy were also associated with greater adiposity in offspring during childhood (Vidakovic et al., 2016).

Preeclampsia. The placenta is vital in the regulation of oxidative stress, angiogenesis, and inflammation for optimal pregnancy outcomes. Preeclampsia is associated with disturbed structural and functional features of the placenta, and these disturbances have been associated with alterations in n-3 LCPUFA metabolism and transport (Rani et al., 2016).

Postpartum Depression

n-3 LCPUFAs are incorporated into neural cells, which improves cellular membrane function and signaling involved in the release of neurotransmitters associated with mood regulation (Calder, 2016; Lauritzen et al., 2016). Maternal n-3 LCPUFA intake has been associated with a reduction in postpartum depression symptoms in multiple reports (Judge, Beck, Durham, McKelvey, & Lammi-Keefe, 2014; Ramakrishnan, 2011; Rees, Austin, & Parker, 2008; Wojcicki & Heyman, 2011). Although the benefits to neural cell function and signaling are compelling in theory, the preponderance of the evidence of the efficacy of n-3 LCPUFA supplementation in the reduction of postpartum depression remains inconclusive, warranting further investigation (Saccone et al., 2016). Dose, duration, and methodologic approaches to measure postpartum depression symptoms are varied across investigations, and the development of a consensus has been complicated by these issues (Judge et al., 2014).

Recommended n-3 LCPUFA Intake During Pregnancy

Expert scientific groups have recommended that pregnant and lactating women consume 200 to 300 mg of DHA daily (Jordan, 2010). The World Health Organization recommends 300 mg of DHA plus EPA per day, of which at least 200 mg should be DHA (Astrup, 2010). The workshop on the Essentiality of and Recommended Dietary

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Intakes for Omega-6 and Omega-3 Fatty Acids, convened by the National Institutes of Health, recommended 300 mg of DHA daily (Simopoulos, Leaf, & Salem, 1999). In its working group report, the World Association of Perinatal Medicine recommended 200 mg of DHA per day (Koletzko et al., 2008). The American Congress of Obstetricians and Gynecologists supports the promotion of dietary DHA consumption for pregnant and lactating women and recommends two servings (8–12 ounces) of n-3 LCPUFA–rich fish per week to ensure n-3 LCPUFA consumption within recommended levels (American Congress of Obstetricians and Gynecologists, 2015). Supplementation with fish or algal oils should be considered only if dietary consumption is problematic. To date, the American College of Nurse-Midwives and the Nurse Practitioners in Women's Health have not released position statements on n-3 LCPUFA consumption for pregnant and lactating women.

Dietary Sources of Preformed n-3 LCPUFA

Given the prevalence of poor n-3 LCPUFA consumption during pregnancy, maternity care providers should encourage the consumption of fish, omega-3–enriched egg, and other fortified products rather than the use of supplements (Nochera et al., 2011). Concerns about mercury and polychlorinated biphenyl contamination in fish have negatively affected receptivity to fish consumption (Oken et al., 2003). In response to increasing concerns about low fish and n-3 LCPUFA intake, in 2017 the U.S. Food and Drug Administration (FDA) and the U.S. Environmental Protection Agency issued updated advice on n-3 LCPUFA intake that focused on minimum consumption amounts rather than maximum consumption amounts (FDA, 2017). The FDA now recommends that women of childbearing age consume a minimum of 8 to 12 ounces per week of lesser-mercury fish to support fetal growth and development. Salmon, pollock, chunk light tuna, cod, tilapia, and shrimp are examples of low-mercury choices (Table 2). In contrast, large predator-type fish including shark, swordfish, king mackerel, albacore tuna, and tilefish should be avoided. Foods fortified or enriched with DHA using fish or algal oils are also good options for individuals who prefer not to eat fish and should be encouraged. Often, manufacturers make claims on food labels that the food contains omega-3 fatty acids such as ALA, which may be misleading to people who are looking for a preformed source of DHA. Individuals should be advised to read the food label to determine if fish or algal oils are listed as ingredients.

Table 2: Fish Options With Lower Levels of Mercury

Fish Species	Long-Chain Omega-3 Content (DHA) (mg/3-oz. cooked portion)
Best choices (eat two to three servings weekly):	
Salmon chinook	618
Salmon pink (canned in oil)[a]	569
Salmon sockeye	476
Sea bass	473
Sardines (canned in oil)[a]	433
Pollock	360
Salmon pink	339
Cod (Atlantic)	277
Chunk light tuna (canned in water)[a]	167
Haddock	93
Cod (Atlantic)	277
Shrimp	120
Tilapia	113
Good choices (eat one serving weekly):	
Blue fin tuna	970
Halibut	132
Grouper	181

Note. From the Food Composition Databases, by the U.S. Department of Agriculture, 2016. Retrieved from https://ndb.nal.usda.gov/ndb.
[a]Lower-cost options.

Supplementation and Omega-3 Fatty Acids

Supplements may be beneficial to ensure adequate dietary n-3 LCPUFA intake for women who have aversions to fish, are vegetarian, or have limited food consumption. Oils derived from microalgae (algal oil) offer a safe alternative for women who are vegetarian, have a fish aversion, or wish to avoid fish oil (Jordan, 2010). Given that not all prenatal multivitamin formulations contain DHA, an adjunctive supplement may be needed.

Assessment of the knowledge, attitudes, and educational recommendations of nurses is needed with regard to omega-3 consumption and/or supplementation during pregnancy.

Dietary supplements that bear the U.S. Pharmacopeial Convention (i.e., USP) seal are advisable, because a margin of safety and quality regarding the identity, strength, quality, and purity of a particular supplement is provided. In multiple large trials with doses much greater than the recommended dose of 200 to 300 mg/day of DHA, investigators did not report safety concerns related to supplementation (Carlson et al., 2013; Kar et al., 2016; Makrides & Best, 2016). Standard fish oil contains approximately 30% of EPA and DHA per 1,000 mg of fish oil, and thus provides 300 mg of EPA and DHA (Vannice, 2014). Concentrated fish oils contain 40% to 80% EPA and DHA in a 1,000-mg capsule (Vannice, 2014). Krill oil supplements contain about 20% EPA and DHA (Vannice, 2014). Given the variability of marine oil products by manufacturer, it is important to read labels carefully and/or contact a manufacturer directly for precise information on specific DHA dose. Although fish oil capsules are most commonly used for supplementation, chewables, liquids, or emulsions offer other viable options based on individual preference. Marine oils may be contraindicated in individuals with allergies to fish or seafood, chronic conditions, pharmaceutical therapies, or medical devices, and these individuals should be referred to their primary care providers to consider marine oil supplementation in the context of overall health and current treatment plan (Mayo Foundation for Medical Education and Research, 2017). People may complain of a bad taste or burping, for which encapsulated forms are typically helpful. More rarely and most often at greater doses, people may complain of other symptoms related to the supplement (Mayo Foundation for Medical Education and Research, 2017).

Role of Clinical Nurses in Promoting n-3 LCPUFA Consumption

Clinical nurses provide nutrition education to pregnant women while carefully considering financial, logistical, and clinical barriers that may interfere with adherence to recommendations. These nurses may identify barriers and refer women to registered dietitians to address more complex dietary issues. The nurse's assessment of a woman's receptivity to eating fish and seafood is fundamental to the development of an educational plan to target optimal n-3 LCPUFA consumption.

Additionally, assessment of typical fish and seafood intake patterns in association with current recommendations provides a basis for individualization of the educational plan. In a recent investigation, Hautero, Poussa, and Laitinen (2017) found that persistent consumption of fish at least once weekly throughout pregnancy or more frequent fish intake three times per week resulted in greater n-3 LCPUFA serum phospholipid levels in mothers and their infants. In the same cohort, women assessed as having middle to high overall healthy dietary patterns using 3-day food diaries and healthy eating index scores had greater n-3 LCPUFA serum phospholipid levels than women with index scores in the lowest tertile. With these results, the researchers highlighted the value of a balanced diet, including optimal consumption of fruits, vegetables, dairy, grains, and meats, to support omega-3 and omega-6 fatty acids.

Role of Advanced Practice Nurses in Promoting n-3 LCPUFA Intake

Nurses in advanced practice who encounter women with multiple issues that complicate dietary intake are charged with ensuring adequate supplementation practices. These nurses may have different levels of knowledge, approaches toward dietary supplements, and concerns about accessibility and safety that may further complicate their recommendation habits. Discussion of dietary practices that surround fish and seafood consumption and overview of current guidelines will provide key information about safe and adequate consumption (FDA, 2017). In addition to individualized dietary counseling, it is important for advanced practice nurses to establish a referral plan involving community-registered dietitians as an adjunct to clinical practice to field more complex nutritional issues.

There is a lack of evidence in understanding the attitudes, knowledge, and prescribing patterns of advanced practice nurses in relation to n-3 LCPUFA. However, knowledge and prescribing behaviors of family physicians related to n-3 LCPUFA have been evaluated in the context of cardiovascular disease (Oh, Beresford,

Table 3: Information on Safety of Dietary and Supplemental DHA Sources

Additional information on safe fish and mercury content https://www.fda.gov/food/foodborneillnesscontaminants/metals/ucm393070.htm
Information of mercury levels in commercial fish https://www.fda.gov/food/foodborneillnesscontaminants/metals/ucm115644.htm
Additional information on contraindications and side effects of fish oil supplements http://www.mayoclinic.org/drugs-supplements/omega-3-fatty-acids-fish-oil-alpha-linolenicacid/background/hrb-20059372

& Lafferty, 2006). The researchers reported that 89% of family physicians provided general dietary recommendations routinely; however, these recommendations included fish or fish oil supplements for only 17% of physicians surveyed. In another investigation conducted in a similar cohort, knowledge of the benefits of n-3 LCPUFA was significantly associated with the prescription of n-3 LCPUFA supplements (Gowani et al., 2009).

Clinical Implications

Strategic educational initiatives should address (a) omega-3 and omega-6 fatty acid dietary food sources, (b) n-3 LCPUFA biosynthesis, (c) mechanistic underpinnings that support the role of n-3 LCPUFA in health, (d) specific recommendations regarding minimum dietary n-3 LCPUFA consumption with respect to weekly dietary intake recommendations, (e) supplementation dose, and (f) alternate non-fish sources. Educational outreach that supports the links between n-3 LCPUFA and significant clinical outcomes should be prioritized. A consideration of groups at risk for poor n-3 LCPUFA intake or adverse outcomes (Table 3) linked with inadequate n-3 LCPUFA is also warranted. Risk factors for poor DHA consumption/absorption include allergy or aversion to fish or seafood, vegetarian diet, fat malabsorption, and hyperemesis with poor total intake. Additionally, recommendations for consumption of safe fish species and those deemed unsafe need to be clearly delineated for pregnant women to prevent the misconception that all fish should be avoided during pregnancy.

Conclusion

In summary, educational strategies should target safe dietary, prescribing, and dosing practices related to n-3 LCPUFA. Knowledge of different dietary sources of omega-3 fatty acids and of the potential for competition from omega-6 fatty acids is critical as a basis for optimizing n-3 LCPUFA consumption in the obstetric population. Preformed dietary sources of n-3 LCPUFA should be a primary educational emphasis, with a consideration of safe supplementation based on current recommendations and key contraindications (Table 3). Economically disadvantaged women should be considered for additional educational outreach to reduce the risk for potential adverse outcomes associated with insufficient n-3 LCPUFA consumption. In this article I highlight the critical roles of nursing professionals at all levels to support optimal omega-3 fatty acid consumption during pregnancy. Further research is necessary to assess the knowledge, attitudes, and prescribing practices of nursing professionals related to dietary omega-3 fatty acid consumption during pregnancy. A clear understanding of knowledge and practice gaps would provide an evidence base for the development of educational strategies to support prenatal nutritional care during pregnancy.

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