BREAST MILK, OMEGA-3, OMEGA-6 FATTY ACIDS AND PEDIATRIC NURSING APPROACH IN HOSPITAL ADMINISTRATION

Huriye Demet Cabar[1*], Gokay Taskaya[2], Nazli Soyler[2]

*[1]School of Health, Department of Nursing, Sinop University, Sinop, **TURKEY***
*[2]Institute of Science, Environmental Health, Sinop University, Sinop, **TURKEY***

*Corresponding author: gonener@hotmail.com

ABSTRACT

The relevant literature is searched this article was aimed to give information about breast milk, Omega-3, Omega-6 Fatty Acids and Pediatric Nursing Approach in this article. For this reason, a literature search was made and an article of review type was written. The main focuses are the fatty acids, the effects of fatty acids on infant development, breast milk and omega fatty acids, the effect of consuming fish on breast milk fatty acids and the pediatric nursing approach in hospital management. As a result, increasing the omega-3, omega-6 fatty acid content in the mother's milk will enable these essential fatty acids to pass through to the baby and contribute to the growth and development of the baby. Therefore, it is important to give mothers information about consumption of omega-3, omega-6 fatty acids in the nursing approach.

Keywords: *Breast milk; Omega-3; Omega-6; Fatty acids'; Pediatric nursing; Hospital administration*

INTRODUCTION

Fatty acids are important in the metabolic processes of all living creatures and are used as energy storage. Besides, fatty acids are a source of energy in human nutrition and physiology [1]. Fats are an organic compound that comes in the form of hydrogen, carbon, and oxygen. Oils are different from each other due to the composition of the fatty acids. The physical, chemical and physiological properties of fats are related to the type and amount of fatty acids in the fats. The roles of fatty acids in feeding are determined by the number of carbon atoms, i.e., the chain length, the number of double bonds, the number of carbon atoms in double bonds, and the position of bonding of hydrogen atoms to the carbon atom, the degree of saturation and unsaturation.The main sources of saturated fatty acids are animal-derived products such as meat and milk [2,3,4,5].

Eicosapentaenoic acid (EPA) can become docosahexaenoic acid (DHA) via docosapentaenoic (DPA) [6]. Tissue EPA level increases when the person intakes

ALA with nutrients. However, DHA levels do not differ. Therefore, DHA, which is in the phospholipid of brain cell membranes, is essential for thecontinuation of neuronal function and is recommended to be consumed with fishery products [7].

For this reason, it is aimed to give information about breast milk, omega-3, omega-6 fatty acids and pediatric nursing approach in hospital management.

Omega-3 fatty acids (ω-3, n-3): The main ω-3 fatty acids are alfa-linolenic acid (ALA), eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA) [8].

Alfa linoleic acid (ALA): Omega-3 fatty acid is the pioneer of it, and involves in the synthesis of EPA and DHA. Flax seeds, walnut oil, cole, fish oil, and canola contain plenty of ALA [9, 10].

Eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA): They have important roles in the prevention and treatment of many diseases such as chronic inflammatory diseases, intestinal diseases, arteriosclerosis, systemic lupus erythematosus (SLE), psoriasis, rheumatoid arthritis [11], diabetes, ulcerative colitis [12]. These fatty acids, synthesized by sea algae, are consumed by the plankton and are incorporated into the food chain with seafood [10]. Besides being found in plants such as sesame, soya bean, and canola; its main source is cold-water fish species [13], which are rich in fat ratio such as bluefish, mackerel, trout, herring, tuna, and salmon [2], ω-3 is also found in green leafy plants such as dill, purslane, cress [14], soybean oil and canola oil, pumpkin seeds and legumes [3].

DHA is an important endogenous compound of the brain, retina, and sperm, which is present in large quantities and participates in many physiological events. It is an important component of marine lipids used in the prevention of cardiovascular diseases. EPA and DHA also play an important role in the preservation of normal brain, vision and heart functions [15] in the renewal of human brain cells [16]. EPA and DHA administer retinal cell proliferation with the brain. In addition, DHA is essential for the development of the retina and brain in the perinatal process [17] and is important in the 4-13 age group for the nervous system [18]. EPA and DHA are also apioneer of the anti-inflammatory effect named lipoxin (LX) and resolvin [19].

Omega-6 fatty acids (ω-6, n-6): Main omega-6 fatty acids are linoleic acid (LA), arachidonic acid (AA) and gamma linolenic acid (GLA) [20]. LA is the primary metabolite in the synthesis of polyunsaturated fatty acids, and the amount of LA in the seed oils of plants is quite high [21].

Linoleic acid (LA): It is taken up with nutrition in sufficient quantity. It is the active ingredient and main source of omega-6 fatty acids [22]. It is found in the safflower (pseudo saffron), grape seed, maize, wheat and cottonseed, soybean [23], eggs, whole wheat bread, vegetable oils and poultry meat [3].

Gamma linolenic acid (GLA): It is quite rich in breast milk. Blackcurrant and garlic are important sources of GLA and it is also present in some types of mushrooms [3].

Arachidonic acid (AA): It can be taken into body with animal nutrients meat kinds such as liver, brain. In addition, it can be synthesized in the body from linoleic acid (LA), which forms a large part of vegetable oils such as soybean, sunflower, corn, canola [24]. It is used in the synthesis of pro-inflammatory

mediators [25], and other eicosanoids. It accumulates in the AA central nervous system with DHA in the last trimester and the first 18 months after birth [26].

Omega-3 resources: When sorted from the densest to less dense taking 100gr dense into account according to nourishment type, it is expressed as flaxseed oil, fish oil, flaxseed, herring, dried marjoram, mackerel, salmon, fresh basil, and fish water in the literature [27].

It is important that at what rate omega-3 fatty acids are in the content of foods. DHA was found to be 2 times higher in calf that fed with fishery products andand mosses, it was stated in some studies that DHA was found to be 20 times higher in salmon [13].

THE EFFECT OF FATTY ACIDS ON INFANT DEVELOPMENT AND IMPORTANCE IN INFANTS

Adults can synthesize docosanohexanoic acid (DHA) from linoleic acid, but this synthesis cannot be made during the first 4 months of life. The required fatty acid is provided by breast milk [28]. Omega-3 fatty acids are crucial for growth and development during pregnancy and postpartum. Especially in the last trimester of pregnancy, omega-3 fatty acids, which are essential for the baby, are provided from the mother. For this reason, nutrition of pregnant women is important for baby health [26].

During the last 3 months of pregnancy and during the neonatal period, the baby's brain tissue develops rapidly. 80% of the DHA ratio in the brain tissues of babies occurs until the 26th week of pregnancy. The specific fatty acids required for the differentiation and development of brain cells are DHA and AA.[1] DHA is dense especially in the synapses membranes of the brain [26].

ω -3 has an important role in the optimal growth and development of the embryo [6]. ω-3 fatty acids have a major role in the prevention and treatment of infant diseases such as cardiovascular diseases, cancer, various mental diseases, hyperactivity disorders [29]. In the literature, the use of omega-3 fatty acids has been reported that it extends the pregnancy span, and plays a role in preventing preterm labor [14], increases birth weight [1]. In the case of lack of omega-3 fatty acids, symptoms such as neurological symptoms, visual acuity decrease, delayed growth, skin lesions, weakness in learning ability, abnormal electro-retinogram [30], slow growth in growth, numbness in extremities, decrease in concentration, behavioral changes and motor movement disorders can be seen [3]. Additionally, it is active in development of infant's retinal and central nerve system in prenatal and postnatal periods [26]; and it has healer effects on obesity, hyperactivity, allergy, autoimmunite, leukemia, malnutrition, infection, anti-inflammatory diseases [25].

Metabolites of omega-6 fatty acids have properties such as inflammatory, hyperalgesic, thrombotic and mitogenic. Also the body needs these metabolite-derived properties. However, their excessive effects need to be limited. The effects of omega-6 metabolites with anti-inflammatory, analgesic, antithrombotic and anti-mitogenic properties of omega-3 fatty acids form the limitations [25]. In the case of lack of Omega-6, hair loss, liver damage, behavioral disorders, renal

damage, excessive sweating, risk of miscarriage, delay in wound healing, and slowdown in growthcan be seen [3].

Recommended intake amount: With industrialization, the food habits of the community have changed and the consumption of ω-6 fatty acids has increased with the decrease of ω-3 fatty acid consumption [14].

In Turkey, in the study conducted by the Ministry of Health, it is stated that pregnant women intake 1.23 g and lactating women average 1.27 g of omega-3; pregnant women daily intake average of 16.4 g while lactating mothers 18.6 g of omega-6 fatty acid on an average [31].

Averagely, women intake 1,1 gr LA and 0.1 gr DHA + EPA with food per day. If LA and high saturated fatty acids are taken with food, only 3% of ALA turns into EPA and 2% into DHA.It is recommended that at least 650 mg / day of unsaturated fatty acid be consumed during pregnancy, at least 300 mg of it should be DHA [26]. In addition, the Turkish Food Codex informs that at least 250 mg of DHA and EPA should be taken with the daily diet, for forming beneficial effect in pregnant or lactating mothers, it will be provided only when 200mg of DHA is taken in addition to recommended intake amount of adults [15]. Generally, the need of lactating or pregnant mothers is 200-300mg of DHA/per day [32,33,34].

In general, the recommendeddaily intake of omega-3 fatty acids for neonatal, children and adults is 0.5-1.6 gr. The recommendedintake amount of omega-6 fatty acids is 4.4-17 gr [20].

ω-6:ω-3 ratio: In the western diet, which is richer than added substances [35], fish consumption is low, ω-3/ω-6 fatty acid ratio differs between 1:7 and 1:50; by this nourishment type, many diseases such as cardiovascular, cancer, inflammatory diseases, osteoporosis and immune system problems increase. Reducing the ratio of omega-6: omega-3 fatty acids with omega-3 fatty acid diet is important in reducing these diseases.With omega-6 fatty acids and rich nourishment, AA increases and pro-inflammatory eicosanoids such as prostaglandins are highly produced in the body [20]. The increase of these eicosanoids in the body results in various side effects [34].

Consumption of processed and unnatural nourishment causes obesity, diabetes, coronary heart disease, people need to feed like 5-10 thousands years ago in order to prevent such diseases. In the caveman diet, which prohibits sugar, white flour and salt [36], 22, ω-6: ω-3 ratio is approximately 1:1 [25]. The United Nations Food and Agriculture Organization recommends that this ratio be kept between 4: 1 and 2: 1 [32].

Breast Milk and Omega Fatty Acids: The baby (fetus) grows up as the nutritional elements are transported by the placenta during pregnancy. For healthy pregnancy period, fetal development, birth and milk production, mother should have a healthy and balanced diet [26]. Breast milk; energy and nutrients necessary for the preservation and development of the immune system, which provides for the maintenance of the health of the newborn, providing adequate and balanced feeding, maintaining the growth and development, maintaining the growth and development [37]. Is the natural and ideal food that is sufficient for both newborns and first 6 months old babies [38,39], which have many benefits as

both mother and baby nutrition, health, immune, developmental, psychological, social and economical [38].

In the literature, it is recommended that the baby should be fed with breast milk for the first 6 months [40,41,42], at the end of this period breastfeeding should go on until 2 years of age [42].

Breastmilk is specific to the needs of every baby, and the "colostrum" is sectarianized for the first 5-7 days after birth. Colostrum turns into "transition milk" between 7-15th days. The milk produced after the 15thday is called "mature milk" [37]. Breast milk fatty acid content significantly differ according to mother's nourishment, pregnancy span, lactation period and geographic regions [43], genetic factors [17] and various population and ethnic groups [44].

Breast milk is the best source of ALA and DHA fatty acids after birth [45]. By consuming during breast-feeding period, Omega-3 and omega-6 fatty acids, especially DHA amount in breast milk, increases [46]. In particular, with the increase of nourishment consuming which are rich in omega-3, breast milk's omega-3 content increases [26] and it transfers from mother to the baby [29].

Omega-3 and omega-6 fatty acids in breast milk differ according to mothers' soci-economic status, nourishment and lactation profiles [47]. Approximately 70-80 mg/L DHA is sectarianizedwith breast milk in lactation period [48]. DHA amount in breast milk differ according to mothers' DHA intake, is influenced by genetic and environmental factors [49]. In a study in which 200 mg of DHA and vegetable oil are added to breastfeeding mothers' diet 4 month during, it is found that mothers who have DHA adding milk lipids and babies' plasma DHA is found as %75 and %35 more [50]. In another study, between4-6thweeks after birth, 89 mothers have received 200mg of DHA adding for 6 weeks. In the end of the study, it is stated that DHA content of breast milks which received 200mg of DHA and 400mg of DHA are significantly higher (%50 and %123) according to placebo group; and it is determined in the literature that especially DHA augmenteraffect fatty acids which are important for brain development and fatty acids compound in breast milk [51].

In randomized controlled studies, it was found that DHA levels in infants were significantly increased when high doses of DHA (> 1 g / d) were given to their mothers [52]. In a study in which children have been tracked for 5 years after 1-year old, the daily diet of children was enriched in the maintenance of omega-3 fatty acids and was found to be effective in the prevention of allergic asthma [53].

In a study conducted on mother who have received Omega support and those who haven't, it is stated that the n-6: n-3 ratio is found as 12:1 in the group of the received ones, as 14:1 in the not-received ones; in the 15th day milk as11:1-14:1 and 6th month milk as 13:1-15:1, in the 3rd month milk this ratio is found as 13:1-15:1. Besides in the study it was found that DHA and EPA contents significantly increased [1]. In the literature, DHA is expressed as beneficial in early period brain development of babies fed with DHA including formulas [54]. For the babies who cannot receive breast milk for various reasons, Food and Drug Administration let supplementing both ω-3 and ω-6 fatty acids in baby formulas proportionately [55].

THE EFFECT OF FISH CONSUMPTION ON BREAST MILK FATTY ACIDS

Breast milk DHA ratio is related to mother's fish consumption. DHA ratio of pregnant and lactating mothers' milk whose diets' are enriched with DHA have been found to be extremely higher than in the rest of the population [56].

Weight of Babies of mothers who have high fishery consumption have been found higher than those who do not consume much, and those mothers have longer breastfeeding span.In the literature, it was reported that mother's fish consumption prenatal period effected children's motor, social and cognitive development scores [57]. Milk composition of low-income Texas mothers with very little fish consumption was measured. 19 out of 22 mother never had fish oil, others consumed once in a year. It was reported that the content of DHA in Texas mothers consuming small amounts of fish, milk, vegetables and fruits was low [58]. In another study in the United States, n-6 /n-3 ratios of milk samples of mothers living in Bolivia Tsimane, a fish-consuming amazon society, were compared with milk samples of women living in Ohio, Cincinnati, n-6: n-3 ratio of Tsimaneli mother was 4:1, this ratio was 8: 1 for mothers living in Cincinnati [59].

In another study of pregnant women's fishery consumption in the United States, it was observed that 65% of them consumed 1-340 g, 23% consumed more than 340 g fish, and 12% consumed no fish [60]. In a study conducted in Turkey by the Ministry of Health, 21% of pregnant women, and 18.4%, of lactating women do not consume fishery products; 24,3% of them because of pregnancy and 18,9% of them increased their fishery product consuming because of lactating period [31]. Moreover, in a study conducted by Şensöz in 2016, it is stated that %17,5 of the women do not consume fishery products ever.

In Norway and Japan which are some of the countries that have high fishery consumption [61], pregnant women's fishery consumption is 34, 4 ±20, 3 g/day and 46, 7 ± 25, 8 g/day [63], respectively. It is stated that fishery product consumption of pregnant women in our country is 23, 92 ± 23, 88 g/day [6]. According to 2013 data, in the developed countries, the annual amount of fish consumed per person is 26, 8 kg. The food consumption of the fish in the world is about 20, 1 kg/per person per year [64]. In Turkey, the amount of fish consumed per person in 2000 was found as 8; in 2016 was 5,4 kg [65].

Table 1. *FDA's fishery product consumption recommendation for pregnant women and parents [66]*

Some Fish Species which can be consumed 2-3 portions* every week
Anchovy, Mackerel, Haddock, Codfish, Hake, Halibut, Sardine, Shad, Grey Mullet, Seabass, Flounder, Salmon, Thornback, Tilapia, Trout
Not-Recommended Fish Species Due to High Mercury Ingredient
King Mackerel, Shark, Swordfish, Big Eye Tuna fish

Recommended Fishery Products and Consumption in Lactation Period

CHILD NURSING APPROACH IN HOSPITAL MANAGEMENT

The Infant Friendly Hospital practice, an integral part of the Mother-friendly Hospital Operations initiated by WHO / UNICEF in 1991 and continued in our country since then, has become increasingly important in recent years [67].

Essential fatty acids sources for babies that are older than 6-month-oldand cannot be breastfed are fish, nuts, walnuts and oils of vegetable origin [68]. In the Postnatal Care Management Guide published by the Ministry of Health, nutritional counseling is given to increase breast milk between 6-24 hours first day after birth and between 2-5thdays [69]. In the nutrition book of the Ministry of Health's Pregnancy and Lactation Period, 3-4 portions of meat, chicken, fish are recommended in the table of Daily Nutrition Consumption Quantity Required for Pregnant and Breastfeeding Women [70], likewise in the Baby Nutrition Guide published by the Ministry of Health for supplementary feeding, 1 egg and 14 to 75 gr of meat, chicken, fish, liver are recommended to be consumed.Salmon, tuna, sardines and mackerel are fish species which are rich in omega-3 [71].

In light of this information, the Ministry of Health and all private hospitals are required to have baby-care and breastfeeding rooms according to Healthy Quality Standards. In addition, it is requested that all the mothers should be educated about breastfeeding in order to monitor the nutritional status of infants and to make the necessary arrangements to feed them correctly and reliably[72]. As an approach to these standards, the roles, responsibilities and functions of pediatric nursing can be independently informed by the appropriate training material in the appropriate settings and venues in the context of the process about the importance of mother's breastfeeding in the 0-2year age range [73]. Among these information, the importance of fish consumption with other food groups can be mentioned especially for sufficient and balanced nutrition [37].

In our country, in order for encouraging mothers to breastfeed and giving information and correct habits about breastfeeding, by Ministry of Health, Mother Breastfeeding and Baby Friendly Hospitals Program has been implemented since 1991. Within the scope of this program, "Successful Breastfeeding" steps have been determined and started to be implemented in the institutions that have the title of "Baby Friendly Hospital" [74].

CONCLUSION AND RECOMMENDATIONS

The fish which is best for meeting mother's daily requirement for DHA during breastfeeding taking place in mother's diet ensures that DHA, which is essential for breast milk, is formed in sufficient quantities. Due to the high omega-3 fatty acid content of the fish, adequate consumption is important for both pregnant and lactating mothers.

By signing protocols with Faculty of Fisheries and School of Health Sciences / Faculty of Health Sciences in our country which is surrounded by 3 sides of the sea, via studies on the development of the fish consumption approach of pregnant and lactating mothers, consumption of fish which is easy to digest and access can be increased. In the baby-care and breastfeeding rooms, banners, public spot, closed

circuit broadcasting system determined by the Ministry of Health and the Hospital Management can be used to inform the mother about the consumption of essential fatty acids and fish in the diet.

The information expressing the use of omega-3 and omega-6 fatty acids during the lactation period, fatty acids consumed by the mother during the development of the fetus and later in the breastfeeding period can be transferred with breast milk being stated, executing trainings by nurses and health professionals, and withhealth managers' supporting this awareness about these trainings' necessity and importance, it may be advised to provide an environment and timetable for forming appropriate training environment.

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