



## DHA IN INFANT GROWTH AND DEVELOPMENT – A RETROSPECTIVE STUDY

Dr. Kiran Narain

Department of Physiology, Nalanda Medical College, Patna.

### ARTICLE INFO

#### Article History:

Received 12<sup>th</sup> July, 2020

Received in revised form 23<sup>rd</sup>

August, 2020

Accepted 7<sup>th</sup> September, 2020

Published online 28<sup>th</sup> October, 2020

### ABSTRACT

Mother's milk and various milk supplements has got different constituents. One of the important constituent docosahexaenoic acid (DHA) is an Omega-3 essential fatty acids found better in mother's milk than any other supplement. Compulsory six months breastfeeding followed by diet rich in DHA has been found to improve overall physical and mental development of pre-term and full-term delivered child. A comparative study between the children on mother's milk and food higher in DHA and with children fed with low DHA has been analyzed and outcome compared in this study.

#### Key words:

Docosahexaenoic acid (DHA), omega 3 essential fatty acid, infant growth and development

Copyright©2020 Dr. Kiran Narain. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### INTRODUCTION

Human milk feeding alone for the first six months of life followed by breast feeding upto two years of life is recognized as the normal standard for infant feeding. Human milk is standard for the human infant as with good nutritional composition and also to have growth factor, immune factors, harmons and other bioactive components which are essential to prevent and protect infants against various diseases. After six months complimentary food is needed to supplement other nutrition's that are essential for the infant.

During last few decades there has been a considerable interest in the role of long chain polyunsaturated fatty acids such as docosahexaenoic acid (DHA) and arachidonic acid (ARA) in infant growth and development. (1). DHA is essential for normal growth, neurodevelopment, vision and overall health during pregnancy and after birth.

Unfortunately 24% of all preterm birth (PTB) (<37 weeks) occur in India, where vegetable-based diets low in DHA are common (2). New evidence demonstrates that benefits of DHA supplementation is for different organs other than brain also which makes it essential for infant a newborn..

#### Composition of Human Milk

Human milk is a complex biological fluid composed of thousands of constituents in different form and factors. It has got proteins non-protein nitrogen, carbohydrates, lipids, different vitamins and different cells with antibacterial property in preventing diseases.

#### Importance of DHA

DHA is a vital constituent of the phospholipids bi-layer of cell membranes which is essential for structure and function throughout the body.

Table 1 Fatty Acids/DHA in Human Milk and Cow's Milk

	Human milk	Cow milk
Long – chain	95%	83%
Medium – chain	5%	5%
Short – chain	0%	12%

Essential fatty acids / DHA can not be synthesized in the body due to lack of required enzymes and must be obtained from milk / dietary food. Essential fatty acids which cannot be synthesized with the body are Omega 3, Omega 6.

Table 2 Fat content of human and cow's milk per 100 ml milk

	Fat (g)	Cholesterol (mg)	Energy (kcal)	Total saturated fatty acids (mg)	Total mono-unsaturated fatty acids (mg)	Total poly-unsaturated fatty acids (mg)
Human milk						
Mean	4.2	16	70	2001	1612	317
(Range)	(3.7-4g)	(12-23)	(65-75)			
Cow's milk	3.9	14	67	2330	1244	107

#### Daily requirement of DHA and its action

National Institute of Health recommends an intake of 300mg/day of DHA for pregnant and nursing women. It has been found in various studies that there is gradual increase of DHA in infant and fetal blood which appears to be as a

\*Corresponding author: Dr. Kiran Narain

Department of Physiology, Nalanda Medical College, Patna.

consequence of dual liver system. The high dose of DHA secreted in the milk of women who deliver prematurely may reflect the enhanced need for this essential fatty acid by premature infants.

#### **Body stores of DHA**

In the first six months of life DHA accumulates about 10 mg/d in the whole body of breastfed infants with about 48% of it appearing in the brain. All breast-milk provide a DHA intake of at least 60mg/d which fulfils the minimum need of 20 mg DHA per day.

The importance of DHA nutrition for visual and cognitive development has been well recognized, and children having good level of DHA have been found to have a higher IQ level.

#### **MATERIALS AND METHODS/RESULTS**

Altogether 50 infants delivered and fed on mother's milk as well as on different formulation feeds were studied in a span of 18 months . The infants were evaluated in terms of their growth, vision, body weight, various organ development and mental status.

It was found that those children who were continuously breast fed for six months, were having a better score of all the above fixed criteria in relation to other market food supplement. Significant visual and neurodevelopment benefits were found from improved DHA availability in full term and pre-term infants. The better neurological developments were assessed by improved attention and various milestones of child development. It was correlated that DHA deficiency is also an additional health risks of prematurity.

Incidence of Necrotizing Enterocolitis (NEC) and Bronchopulmonary dysplasia (BPD) were reported to be higher in infants and children with DHA deficiency or low DHA level. It has been proved by various studies that certainly a difference exists between supplemented formulas and human milk. Interestingly it was found that there is conversion of other free fatty acids to DHA better with mother milk and not with supplemented formulas.

#### **CONCLUSION**

DHA is an Omega 3 essential fatty acid indispensable for overall growth, development and function of brain and retina (3,4). A better mental processing scores and psychomotor development were found to be associated with DHA intake. DHA fortified food including mother's milk helps to maintain plasma phospholipids / DHA content in children. It was proved that an optimum supply from both breast milk and subsequently, complementary foods with an adequate DHA intake has got a great role in general and mental development with improved immunological function of the infant/child.

#### **References**

1. Forsyth, S., S. Gautier and N. Salem (2017). "The importance of dietary DHA and ARA in early life: a public health perspective." *Proc Nutr Soc*:1-6
2. Carlson, S.E., B. J. Gajewski, et al. (2017). "Assessment of DHA on reducing early preterm birth: the ADORE randomized controlled trial protocol" *BMC Pregnancy Childbirth* 17(1):62.
3. Carlson, S.E., S. H. Werkman, P.G. Rhodes and E.A. Tolley (1993). "Visual-acuity development in healthy preterm infants: effect of marine-oil supplementation." *AmJ Clin Nutr* 58(1): 35-42.
4. Bernard, J. Y., M. Armand, H. Peyre, C. Garcia, A. Forhan, M. De Agostini, M.A. Charles and B. Heude (2017). "Breastfeeding, Polyunsaturated Fatty Acid Levels in Colostrum and Child Intelligence Quotient at Age 5-6 Years." *J Pediatr* 183:43-50 e43.

#### **How to cite this article:**

Dr. Kiran Narain (2020) 'DHA in Infant Growth and Development – A Retrospective Study', *International Journal of Current Advanced Research*, 09(10), pp. 23186-23187. DOI: <http://dx.doi.org/10.24327/ijcar.2020.23187.4592>

\*\*\*\*\*