



**Karolinska
Institutet**

From the Unit for Public Health Nutrition, Department of Biosciences and Nutrition
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**Aspects of Feeding Patterns in the First Two Years of Life
in Iranian Infants**

ACADEMIC DISSERTATION

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Abstract

Background: The unique way of providing infants with a perfect nutrition necessary for good growth and development is breastfeeding. Exclusive breastfeeding for the first 6 months is recommended by the World Health Organization. Maternal intake of long chain polyunsaturated fatty acids (LCPUFA), especially omega-3 fatty acids (FAs), during pregnancy and lactation influence the content in breast milk. Docosahexaenoic acid (DHA) is important for infant growth and the development of brain and vision. For vitamins A and D, Iranian authorities recommend supplements for infants from 15 days to 2 years of age.

Aim: To investigate the nutritional situation for Iranian infants by describing the current situation regarding breastfeeding prevalence, promotion and support. Furthermore, to investigate the nutritional content of FAs in colostrum related to mother's diet as well as status for vitamin A and D in infancy.

Methods: Cross-sectional analytic methods have been combined in this thesis to examine the quality of the feeding patterns. Study I and II are based on questionnaire and interview data from mothers of 63 071 infants up to 2 years of age in all 30 provinces of Iran. The data of breastfeeding rates were collected in 2005-2006 (Sep 15th – Jan 15th) by trained health workers in the Integrated Monitoring Evaluation System (IMES) in the Family Health Office of the Ministry of Health. A translated version of a survey, used to assess the current breastfeeding situation in Europe, was also used in study I. Study II used the questionnaire data from IMES to pin point important determinants for early discontinuation of breastfeeding. In study III, breast milk was collected early after delivery from 120 mothers, 60 in each province of Guilan and Kermanshah (coastal area and inland, respectively) during July to September 2008. The mothers were interviewed regarding dietary intake using a food frequency questionnaire. The FA composition of colostrum was measured with gas chromatography. Study IV investigated 7112 infants 15-23 months of age who attended Health Care Centers during early summer of 2001. The sampling method was unequal clusters with unequal household sizes. Vitamins A and D were analyzed with high performance liquid chromatography in an accredited laboratory.

Findings: The policy questionnaire showed that 466 hospitals were accredited as Baby Friendly Hospitals, covering more than 80% of the births in Iran in 2006. On a national level, 89% and 57% of children were breastfed at one and two years of age, respectively. Exclusive breastfeeding rates at 4 and 6 months of age were 57% and 28%. The most common reason for stopping exclusive breastfeeding before six months was, according to the mothers, the physician's recommendation. After 6 months, the mothers stated the major reason to be insufficient breast milk. Mothers in coastal areas had significantly higher intake of fish or seafood during pregnancy than the mothers in inland areas. High fish and seafood intake was associated with significantly higher DHA concentration and lower arachidonic acid/DHA ratio. The mean (SD) concentrations of vitamin A and D were 2.09, (0.83) $\mu\text{mol/L}$ and 61.3 (31.4) nmol/L , respectively. About 1.2% of the infants had plasma levels indicating deficient or insufficient vitamin A. Deficient and insufficient levels of vitamin D were found in 2.8% and 32.9% of infants, respectively.

Conclusions: The general breastfeeding situation, vitamin A status in Iranian infants, and LCPUFA status in colostrum in women were good in comparison with several countries. However, the exclusive breastfeeding prevalence was lower than previously reported. Physicians and other health professionals have an important role in supporting mothers to breastfeed. There is a need for further investigation in regards to the adequacy and compliance of vitamin D supplementation to infants.

Keywords: Breastfeeding, Vitamins A and D, LCPUFA, Iran