CHANGES IN BREAST MILK MACRONUTRIENT CONTENT DURING THE FIRST MONTH IN PRETERM AND TERM INFANTS

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Background: Determination of human breast milk composition has been a topic of extensive research among various populations and ethnic groups around the world and the results are conflicting. Recent advancements in human milk analytical instruments using infrared spectrometry have made rapid analysis of macronutrient composition in breast milk samples possible. Analysis of human milk during different time periods of lactation and investigating the possible factors that may affect the macronutrient content is important to determine the specific needs of term and preterm infants.

Objective: The aim of the study was to investigate the changes in macronutrient composition of breast milk from mothers of preterm and term infants during the first 4 weeks of lactation.

Methods: Breast milk from 39 mothers who had delivered preterm infants and 21 mothers of term infants were collected longitudinally on 3rd, 7th, 14th and 28th days. Crude protein, true protein, fat, carbohydrate and energy content of the fresh milk samples were measured using a mid-infrared human milk analyzer.

Results: Colostral milk protein concentrations of mothers of both preterm and term infants were significantly higher and the protein content of the samples decreased in time, according to the week of lactation during the study period.

Table 1. Demographic data of the patients according to groups.

	Group 1 (preterm) (n=39)	Group 2 (term) (n=21)	p-value
Gestational age (week) ^a	29.7±3.0	38.0±1.1	<0.001
Birthweight (g) ^a	1451±479	3041±470	<0.001
Gender (male) ^b	23 (58.9%)	12 (57.1%)	0.55
Mode of delivery (c/s) ^b	30 (76.9%)	14 (66.6%)	0.54
Maternal age ^a	28.4±5.4	27.5±4.6	0.52
Multiple pregnancy	6	0	0.082

^a Values are given mean ± SD, ^b Values are given as percentage

In contrast, fat, carbohydrate and energy content were lowest in the colostral milk in both groups. When preterm and term milks were compared, fat and carbohydrate levels on 28th day and energy levels on 14th and 28th days were significantly higher in term milks, whereas no difference in protein contents were observed between the two groups on each time period (table 2). There were no statistically significant difference in macronutrient contents regarding maternal age, educational level and area of residence. Mode of delivery was found to have statistically significant correlation with protein content of the milk. Mothers who delivered their babies via c/s had higher protein contents in their milk (1.7±0.8 vs 1.5±0.5, p=0.021).

Conclusion: The longitudinal study revealed significant changes in analyzed contents of mothers' milk over the 4 week period. Macronutrient contents other than protein component may vary regarding to the time of delivery at some time point during the first 4 weeks of lactation. In contrast to previous studies, protein content of the milk was found to be lower in mothers who delivered their babies via vaginal delivery.

Table 2. Comparison of mothers' milk macronutrient contents of preterm and term infants according to time of lactation

	Day of lactation	Group 1 (preterm) (n=39)	Group 2 (term) (n=21)	p-value
True protein (g/dL) ^a	3	1,8 (1,6-2,1)	2,1 (1,7-2,6)	0,176
	7	1,6 (1,4-1,9)	1,6 (1,4-1,7)	0,498
	14	1,5 (1,2-1,6)	1,5 (1,0-1,8)	0,667
	28	1,4 (1,2-1,7)	1,5 (1,2-2,0)	0,437
Fat (g/dL) ^a	3	2,2(1,7-3,2)	2,3(1,8-2,6)	0,675
	7	3,3 (2,6-4,2)	3,4(2,7-4,3)	0,658
	14	3,2(2,8-4,1)	3,8(3,0-4,9)	0,111
	28	3,3 (2,0-4,7)	5,2 (4,5-5,9)	0,001
Carbohydrate (g/dL) ^b	3	6,3±1,0	6,4±0,8	0,577
	7	6,9±1,1	7,1±0,7	0,432
	14	7,2±1,3	7,6±1,0	0,227
	28	7,3±1,3	8,4±1,3	0,005
Energy (kcal/dL) ^b	3	60,3±12,0	59,1±9,6	0,685
	7	68,7±11,9	67,8±11,9	0,778
	14	67,5±12,3	75,7±15,2	0,029
	28	69,7±18,7	87,9±14,2	<0,001

^a Values are given as median (25-75 percentile), ^b Values are given mean ± SD