THE RELATIONSHIP BETWEEN MATERNAL DIET AND PRETERM EXPRESSED BREAST MILK MACRONUTRIENT CONTENT

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Background

Adequate nutrition is important for neurodevelopmental outcomes in preterm-born infants.¹ Breast milk is the preferred source of nutrition for low birth weight and preterm infants as per World Health Organization (WHO) recommendations.² Due to prematurity related complications, these infants usually require expressed breast milk (EBM) to feed. The EBM of a mother expressing for a premature infant is higher in nutritional value than that expressed for a term infant. Even so, breast milk fortification is usually required to meet the high nutritional demands of growing preterm infant.

The composition of milk changes over time. A variety of factors including maternal diet have the potential to affect its composition. WHO recommends lactating mothers require high dietary nutrients and energy.(energy intake of >1800Kcal/kg and protein intake of >60-80g/kg/day).²

Aims

The purpose of this study is:

- To explore maternal dietary intake.
- To collect longitudinal data on the macronutrient content of preterm breast milk.
- To explore the relationship between maternal diet and macronutrient content of breast milk.

Inclusion criteria

- Infants born <32 weeks and/or <1500g.
- Infants mainly or exclusively fed on maternal EBM.

Method

- Prospective cohort study
- Participant mothers and infants recruited at three weeks postpartum.
- The maternal diet on the day of sampling was recorded by 24 hr recall method. Quantitative analysis of the diet was performed using web-based app.
- Expressed breast milk samples, pooled over a 24 hours period, were analysed weekly, using MIRIS Breast Milk Analyser®.

MIRIS breast milk analyser and ultrasonic processor

Results

There were total of 20 mothers and 24 infants that participated. Participants demographic details and results of maternal diet and breast milk composition is as shown in tables. There was no relationship found between macronutrient content of maternal diet and expressed breast milk on analysis using Pearson correlation test.

Protein and energy intake was below WHO recommendations in 44% of maternal diet histories.

Table 1: Demographic details

Mothers(n=20)		Infants (n=24)	
Mean age in years (±SD)	35.6 (4.6)	Mean gestational age at birth in weeks (±SD)	30.2 (3.6)
Mean Weight-kg (±SD)	9.2 (11.8)	Mean age at first analysis in weeks (±SD)	33.2 (2.1)
Mean BMI (±SD)	26 (4.3)	Mean Birth weight in kg (±SD)	1.20 (0.4)
Gestational Diabetes (%)	15	Median days in achieving full MEBM feeds (range)	7 (6-12)
Employed(%)	65	Median Parenteral nutrition-days(range)	6 (4-46)

Table 2: EBM composition according to infants post-delivery age in weeks of life (values expressed per 100ml of EBM)

	3-5 weeks	6-8 weeks	9-11 weeks
Mean energy-kcals (SD)	72.7 (8.1)	71.6 (3.6)	62.6 (4.7)
Mean Protein-g (SD)	1.1 (0.2)	0.9 (0.1)	0.8 (0.1)
Fat -g(SD)	4.97 (5.6)	3.95 (0.4)	4.01 (0.5)

Table 3: Maternal diet macronutrient composition according to gestational age

Mean values (SD)	28-31+6 weeks	32-34+6 weeks	35-38 weeks
	Mean values (±SD)		
Fat (g)	77.1 (46.9)	71.6 (41.3)	68.3 (40.9)
Carbohydrate(g)	160.84 (60.7)	207.3 (78.9)	217.2 (104)
Protein(g)	87.3 (30.0)	86.46 (36.0)	81.2 (33.90)
Energy Kcals	2299 (644)	2004 (484)	2219 (412)

Discussion

The macronutrient content of mother's diet was not shown to have an effect on expressed breast milk. Breastmilk macronutrient composition changes over time, with reduction in protein and energy content, this has nutritional implications for the preterm infant. Dietary intake among mothers varies widely and is below the recommended requirements in some instances.

Future considerations: There is potential to improve maternal diet. There is need to study micronutrient composition of maternal diet and its relationship with breast milk composition.

References:

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