Maternal fasting or fluid abstention does not significantly affect the macronutrient composition of human milk.

Karel Allegaert, Anne Smits

[3]Katholieke Universiteit Leuven, [4]University Hospital Leuven, Leuven, Belgium

Background: there are guidelines on lactation following maternal exposure to analgo-sedatives to facilitate surgery or diagnostic procedures, but these guidelines do not consider the effect of maternal fasting or fluid abstention itself on macronutrient composition of human milk. As macronutrient composition is also relevant when developing physiology-based (PB) pharmacokinetic models to predict drug exposure during lactation, such data are also of research relevance (*to what extent can data collected in this setting be extrapolated*).

Methods: A structured search (PubMed) on 'human milk composition' was performed and this search was screened for title, abstract and finally full paper related to 'fasting' or 'abstention' and macronutrient composition (lactose, protein, fat, solids, triglycerides, cholesterol) by the two authors involved.

Results: the search strategy resulted in 6 papers and one abstract related to religious fasting (n=129 women) and observational studies in lactating women (n=23, healthy volunteers, fasting). These data provide information on two different 'fasting' patterns, with an acute (18-25 h) model in 71 (healthy volunteers, Yom Kippur/Ninth of Av) women, or a more chronic fasting (during Ramadan) model in 81 women (**Table**).

Changes were most related to electrolytes and can be classified as moderate, while there were almost no changes in macronutrients.

reference	study model	most relevant findings, human milk
Prentice et al, 1984	10 lactating women, 2nd-4th week during vs 2 weeks after Ramadan; *morning and evening* human milk samples. 10 non-lactating women as controls for maternal characteristics (morning *vs* evening, lactation *vs* non-lactating: higher weight loss (during the day); more dehydration; higher water turnover, likely because of higher water intake over the night) in lactating women.	during Ramadan *vs* before: osmolarity (+3%), sodium (+25%); lactose (-14%); potassium (-18%). during *vs* after: osmolarity (+3%); sodium (+30%); lactose (-9%); potassium (-5%). during morning *vs* evening, osmolarity (-3%); lactose (-12%); sodium (+55%); potassium (unchanged).
Neville et al, 1987 (abstract) +1993	23 women. Fasting after evening meal, non-caloric containing fluids allowed for 18-20 h. Repeated human milk sampling over the fasting period.	throughout fasting: milk glucose, protein, fat and lactose remained constant, despite maternal insulin and glucose decrease.
Bener et al, 2001	26 women, 2nd-4th week during *vs* 2 weeks after Ramadan. *Morning* sampling after nursing, so more a 'chronic' model.	during *vs* after: no differences in macronutrients (lactose, protein, fat, solids, triglycerides, cholesterol).
Rakicioglu et al, 2006	21 women, 2nd week during *vs* 2 weeks after Ramadan. *Morning* sampling after nursing, so more a 'chronic' model.	during *vs* after: no differences in macro-nutrients; potassium (-25%); dry mass (-22%). Magnesium (-12%); Zinc (-16%)
Zimmerman et al, 2009	48 women, nursing healthy infants (1-6 months) during a 24 h religious fasting period. Paired sampling human milk 2 days before, just after fasting, and 24-25 h later (10 ml milk before nursing).	just after *vs* before: sodium (+16%); calcium (+17%); protein (+9%); phosphorus (-19%); lactose (-6%); fat unchanged. 24 h later *vs* before: protein (+9%); lactose (-3%).
Salah et al, 2016	24 women, paired sampling during (100 ml) *vs* 2 weeks after Ramadan. *Morning* sampling after nursing, so more a 'chronic' model.	during *vs* after: lactose (-6%); protein (-6%); sodium (-28%); potassium (-18%); calcium (-7%); phosphorus (-14%) (fat unreported).

Conclusions: neither short term fasting nor fluid abstention (18-25h) significantly affect the macronutrient composition of human milk, so that this factor should not be considered in prediction models.

Contact information: leen.detaeye@ugent.be