Human milk glucose and IL-6 prospectively associated with duration of exclusive breastfeeding: Findings from the MILK Study

Background:
Breastfeeding is associated with improved maternal health outcomes, including better cardiometabolic health and a reduced risk of ovarian and premenopausal breast cancer, compared to formula feeding. These effects are cumulative, with longer duration and exclusive breastfeeding being more protective. A growing body of research links maternal obesity with shorter breastfeeding duration. Few studies have explored whether obesity-related milk components could reflect altered lactocyte function and provide predictive biomarkers of compromised lactation, once exclusive breastfeeding is established.

Purpose:
To examine associations of obesity-related milk components (insulin, leptin, adiponectin, glucose, and lactose) at 1 month, with the likelihood of non-exclusive breastfeeding (N-EBF) at 3 months.

Methods:
Participants were 212 exclusively breastfeeding (EBF) mother-infant dyads in the Mothers and Infants LinKed for Health (MILK) study, who provided milk samples at 1 month and self-reported their EBF status at 3 months. Milk components that differed (p<0.05) by 3 month EBF status were identified using t-tests. We used logistic regression to examine crude and adjusted associations with N-EBF at 3 months. Maternal race was associated with EBF status at 3 months (p=0.002) and was included as a covariate in our adjusted model.

Results:
At 3 months, 194 participants (91.5%) remained EBF, and 18 (8.5%) were N-EBF. Milk glucose at 1 month was significantly higher in 3 month EBF women (mean: 30.3, SD: 10.3, mg/dl) than in 3 month N-EBF women (mean: 20.0, SD: 9.3 mg/dl; p=0.000). Log-transformed milk insulin at 1 month was significantly lower in 3 month EBF women (mean: 3.22, SD 0.61; µU/mL) than in 3 month N-EBF women (mean: 3.48, SD 0.49; p=0.044). Milk leptin, adiponectin, and lactose did not differ between outcome groups. Adjusting for race, 1 month milk glucose, but not insulin, remained significantly associated with N-EBF at 3 months (AOR 0.35 [95% CI 0.20, 0.63] and AOR 1.38 [95% CI 0.83, 2.27], respectively).

Conclusions:
In this prospective study of exclusively breastfeeding (EBF) women, decreased milk glucose at 1 month was associated with N-EBF at 3 months. Previous human studies have shown a decrease in milk glucose during active weaning. To our knowledge, this is the first study to identify subclinical alterations in milk glucose as an EBF cessation predictor. The data are from a predominantly white, high-SES population of women, which may limit the study’s generalizability, and further study is needed. These findings, however, may have implications for early identification of compromised lactation, allowing for proactive clinical support to promote prolonged exclusive breastfeeding and optimize maternal health outcomes.

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