Human milk lead levels in a cohort of urban Midwestern infants: preliminary results from the MOM2CHild study

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Background: Child blood lead (Pb) levels have dropped dramatically since banning Pb additives in paint and gasoline in the United States (US). However, women of child-bearing age today often experienced higher Pb exposure during childhood, particularly if they resided in low socio-economic environment (SEE) neighborhoods. Approximately 90% of Pb body burden is stored in bone, so lifetime maternal Pb exposures may transfer to infants *via* human milk due to increased bone resorption during lactation. However, the concentration and dose of Pb received through human milk in US infants is understudied.

Objective: We compared Pb concentration ([µg/dL]) and daily dose (dPb) received *via* human milk feeding at two weeks of age by neighborhood SEE in a cohort of infants participating in the ongoing MOM2CHild study (Cincinnati, OH).

Methods: Human milk from 2 weeks post-partum was assessed using inductively-coupled plasma mass spectrometry. Daily human milk intake was estimated based on the child's age and weight, adjusted by the maternally-reported proportion of human milk feeds. SEE was assessed using the Area Deprivation Index score of the mother's neighborhood. The geometric mean (GM) Pb concentration, dPb (µg/kg infant body weight) and proportion consuming Pb above the dietary reference range (RR, dPb ≥ 0.26 µg/kg) were calculated and compared by SEE quartile using linear regression and Fisher's exact test, respectively.

Results: Analysis was completed in 71 milk samples from mothers who were 30.4 +/- 5.0 years old and 47% (*n*=34) primiparous; all had detectable Pb (GM [0.10 µg/dL], max [0.49 µg/dL]). The GM dPb was 0.10 µg/kg, with 11% (*n*=8) exceeding the RR (max dPb of 0.55 µg/kg). Compared to those residing in the highest SEE neighborhoods, children in the lowest SEE neighborhoods had increased dPb (β 0.11 µg/kg, 95%CI 0.04, 0.19), and a higher proportion above RR (11% *vs* 50%, *p*=0.009).

Conclusion: All participants had detectable levels of Pb in their milk at 2-weeks post-partum. Over 10% of infants consumed over the RR of Pb *via* human milk, with the highest dose more than double the recommended limit. Prenatal maternal testing and nutritional supplementation to reduce bone resorption in pregnant and lactating mothers may reduce transgenerational Pb transfer, especially in low SEE neighborhoods.

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