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Ingestion of lead, mercury and selenium by babies through breast milk in Nigeria

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Hg, Pb and Se are the key elements associated with neurotoxicity, and infants are the most susceptible sub-population. This study evaluated the exposure of babies to Pb, Hg and Se through breast milk intake in some gold mining areas of Nigeria. 106 volunteer mother-baby pairs were recruited from three communities with different levels of gold mining activities in Nigeria. These comprised of 27 pairs from Yargilama, Zamfara State; 31 pairs from IPERINDO, Osun State and 48 pairs from Ile-Ife, Osun State. Levels of Pb and Se in breast milk samples from all 106 mothers were determined using ICP-MS while Hg levels in the same samples were determined using a direct mercury analyzer. Next, only for the subjects from Ile-Ife, breast milk intakes in babies were determined over a two-week period using the deuterium dose-to-mother stable isotope technique. At Ile-Ife, the daily exposure of babies to lead, mercury and selenium was evaluated as ranging from 0.11-0.65 µg/kg b.w., 0.03-0.48 µg/kg b.w. and 1.37-9.20 µg/kg b.w., respectively. At IPERINDO and Yargalma, respectively, the values were 0.06-2.34 µg/kg b.w. and 0.13-22.6 µg/kg b.w. for lead, 0.01-0.28 µg/kg b.w. and 0.01-0.23 µg/kg b.w. for mercury and 0.88-29.8 µg/kg b.w. and 0.38-10.2 µg/kg b.w. for selenium. Compared with the benchmark dose for lead suggested by the European Food Safety Authority for developmental toxicity in infants (0.50 µg/kg b.w.) and FAO/WHO daily tolerable intake of 0.57 µg/kg b.w. for mercury, it can be concluded that the intakes of these two neurotoxic elements by babies through breast milk do not constitute excessive risks at Ile-Ife and IPERINDO. Mothers from Yargalma may however require personalized counseling to keep intakes of lead within acceptable risk limits while optimizing the well-established benefits of breastfeeding.

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