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Ingestion of lead, mercury, and selenium by babies through breast milk in three gold mining areas of Nigeria

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Lead, mercury, and selenium 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 three gold mining areas with different levels of gold mining activities in Nigeria. One hundred and six volunteer mother-baby pairs were recruited as follows: 27 pairs from Yargalma, 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. These can be 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.

Biography

Joshua Ojo obtained his PhD in Engineering Physics from the Obafemi Awolowo University, Ile-Ife, Nigeria in 1995. His broad research interest is in assessment of risks associated with exposure to environmental hazards by various population subgroups. His works include both measurements and modeling of exposure to the hazards. He is particularly interested in toxic and essential elements, pesticides, microwave radiation associated with GSM communication and environmental radioactivity. He is the Visionary and President/CEO of the non-governmental organization, Living Science Foundation, which is dedicated in promoting public health and sustainable development of Nigeria through a holistic management of the environment.

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