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Risk assessment of environmental exposure to heavy metals in mothers and their respective infants

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Abstract

Exposure to heavy metals can cause renal injury, which has been well documented in occupational exposure. Studies of low exposure in the general population, however, are still scarce, particularly for vulnerable populations such as mothers and young children. This study evaluated exposure to heavy metals, and biomarkers of renal function and oxidative stress in 944 lactating mothers and their infants and investigated the role of the interaction between heavy metals and oxidative stress in altering renal function. Mother and infant urine samples were analyzed to measure mercury (Hg), cadmium (Cd), and lead (Pb) concentrations for determining body-burden exposure; *N*-acetyl-β-d-glucosaminidase (NAG), α_1-microglobulin (α_1-MG), albumin (ALB), and creatinine (Cr) concentrations for determining early renal injury; and 8-hydroxy-2-deoxyguanosine (8-OHdG) and malondialdehyde (MDA) concentrations for determining oxidative stress. The median concentrclearlyations in mothers presented as µg/g Cr (infants as µg/l) for Hg, Cd, and Pb were 0.695 (0.716), 0.322 (0.343), and 3.97 (5.306) respectively. The mothers and their infants had clearly been exposed to heavy metals and had levels higher than the reference values reported for the general populations of USA, Germany, and Canada. Multiple regression analyses clearly demonstrated associations between urinary