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Impact of Cd and Pb Impregnation on the Health of an Adult Population Neighbouring a Landfill

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Abstract : This case-control study dealt with the health adverse effects within the population neighboring the Mbeubeuss waste dump, which is located near the district of Malika (Diamalaye II) in Dakar (Senegal). All the household and industrial waste arising from Dakar are stored in this open landfill without being covered and are therefore possible sources of Pb and Cd contaminated air emissions and lixiviates. The objective of this study is part of improving the health of the population neighboring Mbeubeuss by determining Pb and Cd concentrations both in environment and humans, and studying possible renal function alterations within the adults. Soil and air samples were collected in the control site (Darou Salam) and the waste dump neighboring site (Diamalaye II). Control and exposed adults were recruited as living in Darou Salam (n = 52) and in Diamalaye II (n = 77). Pb and Cd concentrations in soil, air and biological samples were determined. Moreover, we were interested in analyzing some impregnation (zinc protoporphyrin, d-aminolevulinic acid dehydratase) and oxidative stress biomarkers (malonedialdehyde, gluthatione status), in addition to several nephrotoxicity parameters (creatinuria, proteinuria, lactate dehydrogenase, CC16 protein, glutathione S-transferase-alpha and retinol binding protein) in blood and/or urine. The results showed the significant Pb and Cd contamination of the soil and air samples derived from the landfill, and therefore of the neighboring population of adults. This critical exposure to environmental Pb and Cd had some harmful consequences for their health, as shown by the reported oxidative stress and nephrotoxicity signs.

Keywords : Pb and Cd environmental exposure, impregnation markers, landfill, nephrotoxicity markers
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