

The Bioaccumulation of Lead (Pb), Cadmium (Cd), and Chromium (Cr) in Relation to Personal and Social Habits in Electronic Repair Technicians in Kaduna Metropolis, Nigeria: A Pilot Study

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Abstract : The presence and bioaccumulation of lead (Pb), cadmium (Cd), and chromium (Cr) in blood, urine, nail, and hair samples of electronic repair technicians in Kaduna-Nigeria were assessed using Fast Sequential Atomic Absorption Spectrophotometry. 10 electronic repair technicians from within Kaduna Metropolis volunteered for the pilot study. The mean blood concentrations of Pb, Cd, and Cr in the subjects were 29.33 ± 4.80 , 7.78 ± 10.57 , and 24.78 ± 21.77 $\mu\text{g/dL}$, respectively. The mean urine concentrations of Pb, Cd, and Cr were 24.18 ± 2.98 , 6.81 ± 10.05 , and 14.78 ± 14.20 $\mu\text{g/dL}$, respectively. Mean nail metal values of 37.13 ± 4.08 , 1.00 ± 1.21 , and 18.49 ± 12.71 $\mu\text{g/g}$ were obtained for Pb, Cd, and Cr, respectively while mean hair metal values of 39.41 ± 5.63 , 1.09 ± 1.14 , and 19.13 ± 11.61 $\mu\text{g/g}$ for Pb, Cd, and Cr, respectively. Positive Pearson correlation coefficients were observed between Pb/Cd, Pb/Cr, and Cd/Cr in all samples and they indicate the metals are likely from the same pollution source. The mean concentrations of the metals in all samples were higher than the WHO, ILO, and ACGIH standards, implying the repairers are likely occupationally exposed and are subject to serious health concerns. Social habits like smoking were found to significantly affect the concentrations of these metals. The level of education, use of safety devices, period of exposure, the nature of electronics and the age of the repairers were also found to remarkably affect the concentrations of the metals.

Keywords : bioaccumulation, electronic repair technicians, heavy metals, occupational hazard

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