

Metal pollution and its health effects present a challenge currently facing developing countries. Hair and nail were suggested as more attractive biomarkers among various biopsy materials (teeth, bone, urine, blood and other body fluids) in assessing human metal environmental exposure especially in developing countries because the analysis is economical and not susceptible to contaminations. Recent studies have indicated increasing levels of Pb and Cd in urban and agricultural areas. Studies have identified children as a special risk group as absorption and toxicity of toxic metals is inversely proportional to the age. Absorption of these metals in their gastrointestinal tract also depends on nutritional factors and interaction with other dietary components such as those of Zn, Fe and Ca. This study was therefore set to evaluate the concentration of Pb, Ca, Zn, Cd and Fe in the nails of children (n=200) under the age of six years as bioindicators of risk exposure. The concentrations of these metals were compared in toenails and fingernails samples of children (n=33). The sampling covered schools in both urban and rural settings. Factors that were suspected to influence the accumulation of Pb and Cd in children were obtained using a questionnaire. The atomic absorption spectrometry was used to determine the concentrations of the metals. The heavy metal levels in fingernails of children in urban areas were significantly higher than those of rural areas ( $P < 0.05$ ;  $df = 168$ ). The mean levels in urban areas were  $27.5 \pm 1.8 \mu\text{g/g}$  Pb and  $0.73 \pm 0.08 \mu\text{g/g}$  Cd while those of rural areas were  $19.7 \pm 0.9 \mu\text{g/g}$  Pb and  $0.44 \pm 0.06 \mu\text{g/g}$  Cd. The correlation results indicated that high levels of Pb in the fingernail samples negatively correlated with Zn and Fe ( $R = -0.256$  Zn;  $-0.188$  Fe) but not Ca levels while high levels of Cd had a negative relationship with Fe ( $R = -0.241$ ) only. Other factors that were found to have significant influence were socio-economic background, dietary habits and environmental risk exposure. The results also showed that the school location had more influence on the heavy metals level than the area of residence. The children in a school near the highway were found to have a mean of  $34.4 \pm 3.5 \text{ NL}\mu\text{g/g}$  Pb as compared to those whose residence was near the highway ( $31.6 \pm 2.8 \mu\text{g/g}$  Pb), implying that the contaminants are from a common source. The study established that the mean metal levels were generally higher in the toenail than in fingernail samples. However, the difference was not significant ( $P > 0.05$ ), therefore either the toenail or the fingernail could be used as bio-indicator. The association of toxic metals in the nails of children with environmental exposure and nutritional factors implies that policies and strategies to reduce the heavy metal levels should be implemented and reinforced to address the health issues affecting children in this country. This could be facilitated by improving the conditions of the schools and residential areas and sensitizing the general public on nutrition and effects of heavy metals.