

**Determination of Heavy Metals in Scalp Hair of Selected Kenyan Urban and Rural
Population.**

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ABSTRACT

Pollution by heavy metals contamination and the resulting health effects present challenges currently facing both developed and developing countries. Metal poisoning is not only expensive but also difficult to diagnose, particularly in developing countries where resources are limited. Hair samples (N = 240) were obtained with assistance of barbers and hair dressers located in Nairobi, Mombasa and Kisumu. Concentrations of Lead, Cadmium, Copper, Manganese, Zinc and Mercury were determined in scalp hair of male and female of children and adults of ages (5 - 14, 15 - 20, 21 - 40, > 40 years). Concentrations of the elements in the samples investigated were determined by using Atomic Absorption Spectrophotometer (AAS), applying both flame and flameless techniques in determination of the stated elements. As a control, samples were taken from non-industrialized agricultural rural areas in North Rift, Msambweni and Western Kenya. The generated data was analyzed using Statistical Analysis Software System (SAS) focusing on Analysis of Variance by One-Way (ANOVA), Correlation Analysis, Bar Charts and Line Graphs, Significance tests and Confidence Intervals set at 95 % level of confidence. One-Way ANOVA revealed a significant effect of urban and age on heavy metal concentration (p value of 0.0001 and 0.002 respectively at $p < 0.05$). Linear Correlation between paired metals indicated strong positive correlations. The results revealed that the hair samples of Kenyan urban inhabitants had significantly higher concentrations of all metals Pb, Cd, Cu, Mn, Zn and Hg than those from the rural counterparts at 95% confidence level. The concentration of the studied metals were in the increasing order of $Hg < Cd < Pb < Cu < Mn < Zn$. It was found out that

age and geographical location had great influence on metal hair concentration among the Kenyan inhabitants. Comparing the obtained results in this study with the literature data, Kenyan Scalp hair heavy metal concentration emerged the highest among the other regions of the world, particularly with respect to Cd (1.59 mg/kg) and Mn (27.19 mg/kg). Also, with exception of Nigeria, Libya and Pakistan, Kenya had higher hair Pb (13.52 mg/kg) concentration than the selected countries of the World.