EVALUATION OF LEAD OCCUPATIONAL EXPOSURE IN AN OIL COMPANY IN KINSHASA

Lievin M. Mputu¹, Maguy B. Kasonga¹, Patrick M. Ndelo¹, Dieudonné E. Musibono² and Josaphat Ndelo-di-Phanzu¹

¹Laboratory of Toxicology, Faculty of Pharmaceutical Sciences, University of Kinshasa, Democratic Republic of Congo
²Laboratory of ecotoxicology, Faculty of Science, Department of Biology, University of Kinshasa, Democratic Republic of Congo

Abstract: A study was conducted on occupational exposure to lead in an oil company in Kinshasa. 24 employees of the company exposed to the lead-containing gasoline and 10 un-exposed employees were randomly selected. In each group, venous blood specimens and 24 hr urine samples were collected and submitted to the analysis. The parameters investigated included lead concentration in blood and urine, erythrocyte, leukocyte and thrombocyte concentrations, leukocyte formula, haematocrit and sedimentation rate. Lead quantification was performed by the means of a spectrophotometric method. The principle of this method is based on absorbance readings at 515 nm of the coloured complex formed in chloroform medium between lead and dithizon in appropriate conditions of consists in the lecture. Study results indicated average lead levels of 31.22 ± 10.34 mg / dl and 177.47 ± 93.91 mg / l in blood and urine, respectively. Both blood and urine concentrations far exceeded the standard level or recommend maximum concentrations of ≤ 25μg/dl for blood lead and ≤ 80μg / l for urine lead. The mean levels of lead in the control group were 8.07 ± 3.46 μg / dl and 2.4 ± 21.4 mg / l in blood and urine, respectively. The differences in lead concentration observed between the experimental and control groups were statistically significant (p<0.05), according to the Student t-test. The haematological tests conducted on venous blood of exposed workers showed signs of lead toxicity as confirmed by morphological studies of some blood components. In conclusion, the results obtained from this study strongly suggest that some of the employees examined were dangerously exposed to high concentrations of lead and were subjected to lead poisoning.

Keywords: Lead, Oil Company, occupational exposure, blood, urine, toxicity biomarkers.