

Determination of current lead concentration in human blood by human biomonitoring in selected Sri Lankan populations

K.K.K.H. Amaranayaka¹, M.P. Deeyamulla¹, K.A.D.C. Gunasekara²

Lead contamination of human blood from occupational origin and vehicle emission is a cause for concern because of its potential accumulation ability in the environment and in living organisms leading to long term toxic effects. This study was aimed to assess the concentration of lead in blood of different groups exposed to different occupational conditions. Groups were selected based on the hypothesis that concentration of lead in blood may vary according to the type of exposure. Blood lead levels in students, drivers and workers of University of Kelaniya, motorcyclists and fuel station attendants in Kiribathgoda city area were studied. All other groups except fuel station attendants expose to vehicle smoke during their occupation and travelling. But fuel station attendants expose to vehicle smoke and gasoline vapors excessively during their duration of occupation than others. Some of the general population selected from a rural area who are least exposed to vehicle emissions and any occupational condition were used as the control group. A questionnaire was given to each volunteer that participated in the study to obtain the type and duration of exposure to check whether there is any correlation with lead level in blood to that parameters. Venous blood was obtained by a trained nurse and concentration of lead was determined by graphite furnace atomic absorption spectrophotometer after a microwave digestion. All analyzed groups except control group contained elevated level of lead in blood than the WHO recommended maximum level. Statistical analysis were carried out to identify the correlation between elevated level of lead in blood with the type of the exposure and the duration of the exposure. Statistical analysis revealed that lead level in blood is significantly different in each study group. Blood lead levels are found to be in, students ($102.58 \pm 18.50 \mu\text{g L}^{-1}$), drivers ($208.50 \pm 86.70 \mu\text{g L}^{-1}$) and workers ($124.18 \pm 27.05 \mu\text{g L}^{-1}$) of University of Kelaniya, motorcyclists ($115.34 \pm 15.30 \mu\text{g L}^{-1}$) and fuel station attendants ($220.00 \pm 65.90 \mu\text{g L}^{-1}$). It was also observed that individuals who smoke cigarettes had extremely high levels of lead in blood with respect to non-smokers within a same study group.

Key words: Blood lead level, Lead, Occupational exposure, Graphite furnace atomic absorption spectrophotometry.

¹Department of Chemistry, University of Kelaniya, Kelaniya, Sri Lanka.
mpd@kln.ac.lk

²Department of Biochemistry and Clinical Chemistry, University of Kelaniya, Kelaniya, Sri Lanka.