Lead Levels in Milk and Blood from Donors to the Breast Milk Bank in Southern Brazil

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Abstract: Brazilian scientific production on the adverse effects of lead on the general population is still very limited. Lead, a potentially toxic substance, has become a public health problem due to its effects, mainly affecting the central nervous system and the effects on the synthesis of heme. The aim of this study is to evaluate the level of lead exposure of donors to the breast milk Bank in the city of Londrina, Parana, by estimating the levels of that metal in milk and blood samples. This is a cross-sectional study conducted during the period of January and July, 2007. All mothers who were enrolled as donors in the breast milk Bank were included in this study. A total of 92 volunteers that presented the following inclusion criteria were included in the project: volunteers who were healthy, without any chronic disease, full term pregnancy, breastfeeding between the 15th and 210th day after the baby was born, and living in the city involved in the study. Lead in milk and blood was quantified using the ICP-MS technique (Inductive Coupled Plasma Mass Spectroscopy). All mothers signed a consent form approved by the Research Ethics Committee from Londrina State University. The median lead concentration in milk samples was 3.0 μg/L, varying from 1.0 to 8.0 μg/L. Average amount (median) of lead in blood was of 2.7 μg/dL, varying from 1.0 to 5.5 μg/dL. In Spearman correlation analysis, significant but modest correlations could be observed between the concentration of lead in blood and in milk (r_s=0.207, p=0.048), hemoglobin and ALAD activity (r_s=-0.264, p=0.011), level of lead in blood and mother’s age (r_s=0.227, p=0.029). However, for haematocrits and haemoglobin, the correlation was higher (r_s=0.837, p<0.001). No statistically significant associations were found between concentrations of lead in milk and blood and demographic variables studied, obtained through interviews and validated questionnaire. The ratio lead in milk/blood was equal to 0.11. In general, the values found in the present study are similar to those obtained in non-exposed populations in other countries, and are within normality.

Keywords: Lead exposure, lead in human milk, ICP-MS; ALAD activity.