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BLOOD LEAD IS A PREDICTOR OF HOMOCYSTEINE LEVELS IN A POPULATION-BASED STUDY OF OLDER ADULTS

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Running head: BLOOD LEAD AND HOMOCYSTEINE

Key Words: homocysteine; blood lead; tibia lead; cross-sectional study

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Abbreviations: GED, graduate equivalency diploma; ALAD, δ -aminolevulinic acid dehydratase;
OR, odds ratio; MCP-1, monocyte chemoattractant protein-1; IL-8, interleukin-8

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ABSTRACT

Lead and homocysteine are both associated with cardiovascular disease and cognitive dysfunction. The relations among blood lead, tibia lead, and homocysteine levels were evaluated by cross-sectional analysis of data among subjects in the Baltimore Memory Study, a longitudinal study of 1,140 50-70 year old randomly-selected residents in Baltimore City. Tibia lead was measured by ^{109}Cd K-shell X-ray fluorescence. The subject population had a mean (SD) age of 59.3 (5.9) years, and was 66.0% female, 53.9% white, and 41.4% black or African American. Mean (SD) blood lead, tibia lead, and homocysteine levels were 3.5 (2.4) $\mu\text{g/dL}$, 18.9 (12.5) $\mu\text{g/g}$, and 10.0 (4.1) $\mu\text{mol/L}$, respectively. In unadjusted analysis, blood lead and homocysteine were moderately correlated (Pearson's $r = 0.27$, $p < 0.01$). After adjustment for age, gender, race/ethnicity, educational level, tobacco and alcohol consumption, and body mass index using multiple linear regression, results revealed that homocysteine levels increased 0.35 $\mu\text{mol/L}$ per 1.0 $\mu\text{g/dL}$ increase in blood lead ($p < 0.01$). The relations of blood lead with homocysteine levels did not differ in subgroups distinguished by age, gender, or race/ethnicity. Tibia lead was modestly correlated with blood lead (Pearson's $r = 0.12$, $p < 0.01$) but was not associated with homocysteine levels. To our knowledge, these are the first data to reveal an association between blood lead and homocysteine. These results suggest that homocysteine could be a mechanism that underlies the effects of lead on the cardiovascular and central nervous systems, possibly offering new targets for intervention to prevent the long-term consequences of lead exposure.