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Low-level blood lead and anaemia in infants

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Background: Low-level blood lead levels (BLL) were found to be associated with an adverse health effects in children. The objective of this research was to determine blood lead level in anaemic infants and toddlers and to evaluate factors associated with BLL.

Methods: The questionnaire based data (14 items), BLL and haemoglobin (Hb) concentration, red blood cell indices (MCV, MCH, MCHC, RDW) and S-ferritin were determined in 44 children living in a highly industrialised city and vicinities of Siauliai district (Lithuania).

Results: There were 44 anaemic (Hb<120 g/L) children aged 9 to 40 months investigated. The mean (SD) BLL was 1.92 µg/dL (1.15). The 25, 50 and 75 percentiles for BLL were 0.95, 1.74 and 2.86 µg/dL, respectively. The girls had higher BLL of 2.11 µg/dL (1.22) than boys did – 1.76 µg/dL (1.08). We detected higher BLL in summer and autumn than spring, $p>0.05$.

We found significant ($p<0.05$) negative correlations between BLL and MCV, BLL and MCH, BLL and MCHC, and positive correlation between BLL and RDW. Iron depleted babies with S-ferritin <12 ng/mL had a higher mean BLL than did not-iron depleted children (2.16 vs. 1.74 µg/dL, $p>0.05$).

The higher than 3 µg/dL BLL were significantly associated with microcytosis (MCV<70 fl), consumption of tea >500 mL/day, good appetite and living outside the city, $p<0.05$. Other factors were autumn season, female-gender, children born from 2nd or later delivery, consumption of milk more than 500 mL/day, living near busy street, using pottery for cooking and pica, $p>0.05$.

Implications: Our data suggest that microcytosis and hypochromia, indices of iron deficiency anaemia, is associated with higher (>2 µg/dL) BLL, which is still much below acceptable (10 µg/dL) blood lead levels in children.