

BLOOD LEAD LEVELS IN SCHOOLCHILDREN LIVING NEAR TO AN INDUSTRIAL ZONE IN CALI, COLOMBIA: THE SYNERGISTIC ROLE OF SOCIOECONOMIC CONDITION

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Background and Aims: In developing countries, distribution of health effects associated to lead sources could be differential, in particular, because greater exposure and susceptibility occur among people with lower socioeconomic condition (SEC). Northern Cali-Colombia limits with a large industrial zone producing steel, batteries and metals. According to previous reports, high concentrations of airborne lead ($1.77\mu\text{g}/\text{m}^3$) may reach population living in the area. We determined blood lead levels (BLL) in schoolchildren 6-14 years old exposed to industrial sources of lead and to evaluate the synergistic role of SEC.

Methods: A cross-sectional study was conducted in an area exposed to industrial pollutants in northern Cali. A control area was also studied and children in two schools at corresponding study areas were selected. Venous samples (5 mL) were collected in heparinized, evacuated tubes to determine BLL by graphite furnace absorption spectrometry. Using regression models we assessed risk factors for high BLL, controlling for potential confounders and evaluating the potential effect modification of socioeconomic condition.

Results: We enrolled 350 schoolchildren, 44.5% living in the exposed area. Schoolchildren in this area had higher BLL (4.7 ± 1.6 vs. 2.9 ± 1.2) and prevalence of BLL $\geq 5\mu\text{g}/\text{dL}$ (44.2% vs. 8.2%, $p:0.000$) than those in control area. An independent association was found between exposure and BLL $\geq 5\mu\text{g}/\text{dL}$ (OR:16.3; CI95%:6.7-30.1), younger age (OR:2.1; CI95%:1.1-4.1), male gender (OR:2.7 CI95%:1.4-5.3), lower socioeconomic condition (OR:2.5; CI95%:1.2-5.0), middle/low parent's attained education (OR:2.3; CI95%:0.97-5.9) and black ethnicity (OR:4.7 CI95%: 1.8-14.9). Additionally, synergistic effects on greater risk of BLL were observed between low socioeconomic condition (P for interaction: 0.000).

Conclusions: Residence in an urban area exposed to industrial lead emissions is associated to higher levels of BLL. Socioeconomic conditions and male sex modify observed BLL, with a greater risk of exposure. Given that higher disease susceptibility is also expected among those children, health effects could be potentiated in these children.

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