



# A Comparative Study of Blood Lead Levels in Children Under Five Relative to Proximity to Artisanal Gold Mining in Migori County, Kenya

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## Abstract

Artisanal and small-scale gold mining (ASGM) is a prevalent economic activity in Migori County, Kenya. Mining processes can disturb lead-containing ores, posing a potential environmental health risk. Young children are especially vulnerable to lead exposure, which can cause severe neurological impairment. This study aimed to determine the correlation between residential proximity to ASGM sites and blood lead levels in children under five years of age in Migori County. A cross-sectional comparative study was conducted. Participants were divided into two groups: an exposed group residing within 2 km of active ASGM sites and a control group residing over 5 km from any mining activity. Venous blood samples were collected from children under five. Demographic and household data were gathered via questionnaires. Blood lead levels were analysed using graphite furnace atomic absorption spectrometry. Children in the exposed group had a significantly higher geometric mean blood lead level (8.7 µg/dL) than those in the control group (3.2 µg/dL). Furthermore, 42% of children near mining sites had blood lead levels exceeding the 5 µg/dL reference level, compared to only 6% in the control group. Proximity to artisanal gold mining sites is strongly associated with elevated blood lead levels in children under five in this setting, representing a significant public health concern. Immediate public health measures should include community education on lead exposure risks and the introduction of routine blood lead screening for children in affected communities. Longer-term strategies must involve the promotion of safer mining practices, environmental remediation, and stronger regulation of mining activities. lead poisoning, child health, artisanal mining, environmental exposure, Kenya, blood lead level This study provides comparative evidence linking residential

proximity to artisanal gold mining with elevated paediatric blood lead levels in a Kenyan context, highlighting a critical environmental health priority for local policy and intervention.

**Keywords:** *Artisanal and small-scale gold mining, Blood lead levels, Environmental health, Sub-Saharan Africa, Paediatric epidemiology, Heavy metal exposure, Kenya*

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