

Evaluation of lead toxicity among primary school children in Nepal

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Introduction: Lead toxicity is one of the greatest environmental threats to children and primarily affects the developing brain.

Objective: To estimate Blood Lead Level (BLL) and its associated risk factors and impact on health in primary school going children in Nepal.

Methods: School children, 5-12 years (n=612) living near high traffic roads with air pollution were investigated from June 2012 to November 2013. Children (n=308) from 10 schools of industrial region eastern Nepal and others (n=304) from 8 schools of Kathmandu metropolitan city were enrolled in this study after taking consent from school teacher/guardians. Blood samples were collected from each child and BLL was determined using Flame Atomic Absorption Spectrophotometer (FAAS). Intelligent Quotient (IQ) was assessed using Seguin Form Board Performance Test.

Results: We found 82% children (n=503) having detectable BLL and 64.7% children (n=396) had BLL more than 5 µg/dl. In addition 51.79% children (n=317) had above the WHO level of concern (10 µg/dl). Seven percent of children were found to be high risk of toxicity of lead exposure (>70 µg/dl). The BLL was found to be significantly negative correlated with blood hemoglobin (p=0.002), but only negative correlation with total calcium (-0.045) and IQ (-0.077). Using multivariate regression analysis, low socioeconomic status, increasing age, anemia, hypocalcaemia and living homes with chipped wall paints are potential factors associated with high BLL in children (P=0.001) of Nepal.

Discussion: This first baseline study is a pointer to the perils of environmental lead exposure among children of Nepal. According to WHO lead level of concern (≥ 10 µg/dl), it reports more than 50% Nepalese children are the risk of lead poisoning and average mentally retarded. The negative correlation of BLL with IQ also explains that lead toxicity can disrupt the children's brain development. The consequences of significant adversity early in life prompt an urgent call for innovative strategies to reduce lead toxicity within the context of a coordinated system of policies and services guided by childhood and early brain development.