

Lead pollution and its implications for children in Pakistan

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Lead pollution is one of the leading problems of environmental origin. It is proven to be a major risk to health of the population particularly children. Its higher level in the blood results in encephalopathy and death while lower level result in neurotoxicity, hypertension, renal impairment, and altered cognitive functions. It is well documented that lead exposure even in low doses to children result in lower intelligent quotient (IQ) level. Human brain in its developmental stages is very sensitive to the toxic insults. Since placenta offers no barrier to lead so fetal blood lead correlate strongly with the maternal blood levels. There is strong evidence that prenatal exposure to lead results in impaired cognitive development, abnormal fine motor functioning, behavioral problems, low intelligent quotient and antisocial and delinquent behavior in childhood and adolescence. Over 40% of Pakistan's population is aged less than 15 years. In developing countries like Pakistan childhood malnutrition is very prevalent. The ill effects of lead are likely to be more harmful in these malnourished children.

Environmental lead level is very high in Pakistan. High level of lead in the air has resulted in very high level of the blood lead levels in major cities of Pakistan. The varied sources of the atmospheric lead are resulting in high blood lead level among different population groups. Studies have demonstrated consistently that the levels of lead in blood of different population groups are higher than recommended levels. Studies have documented high lead levels among psychiatric patients, preschool children in Islamabad a low air lead area, Karachi a high atmospheric area and among ammunition factory workers. A study in 1989 reported that mean blood lead levels among males, females, soldiers and school children were 34.4, 31.8, 29.9 and 38.2 $\mu\text{g}/\text{dl}$ respectively, while a recent study reported a lower mean lead level of 15.6 $\mu\text{g}/\text{dl}$ that is still very high. A recent study by our Department at Aga Khan University showed that 80% of less than five year children in various communities of Karachi had lead level greater 10 $\mu\text{g}/\text{dl}$. The important predictor of blood lead levels were environmental lead level measured by distance of house from traffic cross-section, traveling in open vehicle, application of surma, father's occupation in lead related industry. A particular community away from road traffic also demonstrated very high lead levels.

Road traffic is the major source of air pollution. The number of vehicle has increased considerably in the cities of Pakistan. Number of vehicle has increased from 281587 in 1980 to 1167635 in 1998. Till recently leaded gasoline was used in Pakistan and was the major source of environmental lead pollution. In last couple of years phasing out of the lead from gasoline has been implemented. Water and food in Karachi also contain an appreciable quantity of lead and may contribute to human exposure. A study on metals in drinking water from Karachi East reported the quantity of lead is significantly greater than the WHO recommended criteria. Food is cooked in metal containers that leach lead and other metals during cooking and storage.

The most important action is phase out of the lead from gasoline. The petroleum companies have decreased the lead level in gasoline. United Nation Industrial Development Organization is helping government for shifting towards cleaner fuels. They are providing technical expertise for upgrading refineries. Vehicle manufacturers have also shifted their production to be installed with catalytic converters that will be compatible with the low lead fuel and will also reduce the tail pipe emissions. However actions are necessary for regulating industrial emissions, use of pottery coated with lead alloys, lead based paints and battery manufactures and recyclers. The effects of the exposure to lead which has already occurred in the population or that is still present in environment needs to be studied and interventions designed. There is also need for studies on children particularly newborn as they get exposed to lead prenataly. Other intervention on measures to reduce the effect of this exposure also needs attention.