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Lead-Based Paint is a Hazard to Young Children: Implications for Pakistani Children

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Background

The toxicity of lead, especially among young children, is well documented worldwide^{1,2}. Yet it is only during the past 15 years that the history of this tragic situation has been addressed in any detail³.

Lead is a soft bluish-white heavy metallic element that combines with other substances and is one of the most useful materials in the world⁴. However, elevated blood lead levels (greater than 10 mg/dl) causes numerous discomfort-abilities and diseases⁵, even though evidence exists for subtle effects at lower levels⁶ as well. Although lead can affect every system in the body, the major systems affected are the central nervous, blood and the renal systems⁷⁻⁹. Low levels of lead in children can result in reduced intellectual abilities and anti-social behaviors^{10,11}.

while high kvcls may cause coma and even death¹²⁻¹⁴. Poor children are especially at higher risk because inadequate nutrition increases lead absorption by the body¹⁵⁻¹⁷, as a study from Cape province of South Africa revealed that over 90% of children in urban and rural communities have blood lead levels greater or equal to 10 mm/dl¹⁸.

Among all sources of lead¹⁹⁻²⁵, lead-based paint²⁶ is the major source of childhood lead poisoning in the United States. This finding is consistent as a study conducted in India exhibited 67% elevated blood lead levels among children between age 6-72 months, where lead-based paint was the strongest associated risk factor for this rise²⁷. Study in Hong Kong also suggests that color of the wall-paint used in the house may be a factor influencing the house dust Contamination²⁸, while another study from Beijing²⁹ revealed that toys which have been coated by a type of paint were responsible for the elevated blood lead level among children.

Lead has been used in paint since ancient times, as a pigment and drying agent in oil based paint for making it durable, to inhibit the growth of mold on the surface of the paint and to give it a bright color²⁶. Thus, paints with higher lead levels were used where exposure to moisture is greatest: on windows, doors, bathrooms and exterior walls.

In 1904, an Australian was among the first English-language author who directly linked lead-based paint to childhood lead poisoning, specifically noting the dangers to children from painted walls and verandas of houses³⁰. Frequent hand to mouth activity (pica) of young children in a lead-contaminated home provided an important path of ingestion of leaded dust, which could deliver enough lead to cause irreversible damage to the developing nervous system of a child under the age of 7 years²⁶. A child's digestive tract will absorb a high proportion of lead (50%) in comparison to adults (10%)³¹. Most importantly, the period of rapid growth and development in the early years of life leaves the body's system most vulnerable to the effects of lead toxins, as lead deposition in bone causes growth failure^{32,33}.

Pathways and Sources of Lead-Based Paint

If lead paint is in proper condition and not chalking or flaking, it is not dangerous³⁴. However, paint can become a threat when it is damaged due to abrasion, water, poor maintenance, poor construction work and the opening and closing of lead-painted windows and doors. A remodeling or repair job can release lead particles, especially if it involves breaking of a lead-painted wall or

ceiling. Based on a report³⁴ that many schools, parks and community playgrounds across the United States have painted metal or wood playground equipments that causes an additional source of lead paint poisoning hazard for young children. Equipments as stated in the report, were painted with lead paint and over time exposure to sunlight, heat, moisture and normal wear and tear caused the paint to deteriorate into chips and dust containing lead. Young children who put their hands on the equipment while playing and then put their hands in their mouths can ingest the lead paint chips and lead dust. By glancing at the equipments in public playgrounds in Pakistan, it is evident that they are old enough to have all the above-mentioned situations.

Lead could be found both in interior and exterior-painted surfaces, interior woodwork, doors and windows. When properly maintained and managed, this paint poses little risk, however friction surfaces such as windows and windowsills, doors and doorframes, stairs and railings are of concern. Lead-based paint that peels (choona) or deteriorates is especially risky.

Basically the older a home, the greater the risk lead-based paint poses. Based on a report from New Zealand, until 1965 paints in the NZ market contained high lead levels, specifically before 1945.

Even if a building has been recently painted, it may have been painted with lead-based paint or have layers of old paint covered with new paint and in US approximately three-quarter of the homes built before 1978 contained lead-based paint. Children whose homes are being renovated are also extremely at high risk. A study in New York³⁵ concluded that those persons exposed to lead were affected more not only through lead-based paint chips and flakes that were visible, but also through fine dust particles. This dust can get onto carpets, floors, furniture, toys, under objects such as cabinets and refrigerators that are difficult to clean or mop. In addition, adults and children alike bring into the home fine dust particles on their hands from places where they play and work.

Lead is very resistant to corrosion and it can remain a problem until removed. We might have lead in and around of our home without knowing it, because we cannot see or smell it. Hence, it exhibits all the above possible conditions and exposures that pose a potential threat to our children.

An estimate based on a report, discounted cost in 1998 for treatment of a single lead-poisoned child exceeds \$40,000¹⁵. The prevention of exposure to lead is more cost-effective than the treatment³⁶, which is revealed by three national health and nutrition examination surveys in US from 1976 to 1980, 1988-to 1991 and 1991 to 1994. These surveys showed a decrease in the overall mean blood lead levels for the general US population from 12.8 to 2.8 to 2.3 mg/dl³⁷⁻⁴⁰.

These declines were attributed to the removal of lead from paint, gasoline and food cans.

In Pakistan, low-income household commonly utilize water-soluble-paint, as it is cheaper. Due to humid weather in most cities, which causes paints on the walls to start bulging, deteriorating and peeling subsequently young children living in such an environment are likely to be exposed to lead. Furthermore, poor water piping in these cities leads to water leaking from pipes that adds an additional factor to this situation.

Few articles have been published from Pakistan^{41,42}. For example; a recent study in Karachi⁴³ showed that 80.5% of study subjects had blood lead levels above 10 ug/dl, which is defined as "elevated blood lead levels"¹¹. Nevertheless, none of them specifically emphasized that lead-based paint was the cause for elevated blood lead levels.

Conclusion

Primary intervention of lead poisoning seems to be more cost effective²⁸, than treating children who are affected¹⁴. Public health efforts are required for the removal of environmental lead hazards which are present in almost all parts of the environment⁴⁴, by preventing exposure to children who

are exposed to such conditions especially paint on a daily basis in their homes, schools, playground and parks. Companies providing lead paint need to be informed of the hazardous effects of lead and be advised to not add lead to their products. Community orientation and provision of health education is necessary and special emphasis needs to be placed on continued research on environmental hazards in general and lead-based paint in particular.

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