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Evaluation of lead poisoning in children age ranged 2-10 years old

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Abstract

Background: Lead poisoning is one of the major environmental diseases among children in developing countries. The present study was conducted to assess lead level in children.

Materials & Methods: The present study was conducted on 156 cases of lead poisoning of both genders of age ranged 2-10 years. In all children, symptom suggestive of lead poisoning like pallor, unexplained fatigue, abdominal pain, constipation or anorexia, deteriorating school performance, and recently acquired irritability or hyperactive behaviour was recorded. Reasons for lead poisoning were recorded.

Results: Out of 156 patients, boys were 80 and girls were 76. Age group 2-4 years had 26 children, 4-6 years had 67, 6-8 years had 35 and 8-10 years had 28 children. Possible reasons seen in children were thumb sucking (26), use of colored toys (68), pets (34), absence of hand washing (65), use of herbal medications (35) and pencil biting (82). The difference was significant ($P < 0.05$).

Conclusion: Lead poisoning in children is a serious issue. The possible reasons found was thumb sucking, use of colored toys, pets, absence of hand washing, use of herbal medications and pencil biting.

Keywords: Children, Lead poisoning, pencil

Introduction

Lead poisoning is one of the major environmental diseases among children in developing countries^[1]. A recent controversy involving a popular brand of noodles in India recently led to increased awareness about the potentials of lead toxicity. Exposure to even extremely small amounts of lead can have long-term and slowly accumulating deleterious effects in children^[2].

State and local childhood blood lead surveillance systems retain the results of blood lead tests of children reported to state health departments by private laboratories, as well as state and local government laboratories. The reporting criteria of BLLs from the laboratories to the state are set by each state and vary across jurisdictions^[3].

Primary prevention, reducing or eliminating the myriad sources of lead in the environment of children before exposure occurs, is the most reliable and cost-effective measure to protect children from lead toxicity^[4]. Very high blood lead concentrations (eg, $>100 \mu\text{g/dL}$) can cause significant overt symptoms, such as protracted vomiting and encephalopathy, and even death. Low-level lead exposure, even at blood lead concentrations below $5 \mu\text{g/dL}$ (50 ppb), is a causal risk factor for diminished intellectual and academic abilities, higher rates of neurobehavioral disorders such as hyperactivity and attention deficits, and lower birth weight in children^[5]. The present study was conducted to assess lead level in children.

Materials & Methods

The present study was conducted in the department of pediatrics. It comprised of 156 cases of lead poisoning of both genders of age ranged 2-10 years. The study protocol was approved from institutional ethical committee and written consent was obtained from parents of all children.

Data related to children such as name, age, gender etc. was recorded. In all children, symptom suggestive of lead poisoning like pallor, unexplained fatigue, abdominal pain, constipation or anorexia, deteriorating school performance, and recently acquired irritability or hyperactive behaviour was recorded. The blood sample was obtained under sterile conditions. Reasons for lead poisoning were recorded. Results were tabulated and subjected to statistical analysis. P value less than 0.05 as considered significant.

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Results

Table 1: Distribution of patients

Total- 156		
Gender	Boys	Girls
Number	80	76

Table I shows that out of 156 patients, boys were 80 and girls were 76.

Table 2: Age wise distribution

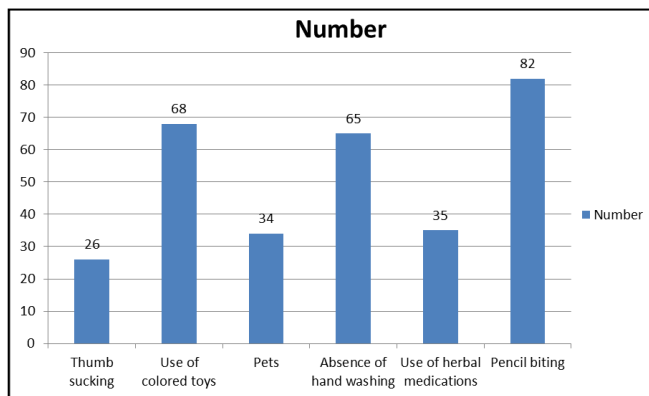
Age group (Years)	Number	P value
2-4	26	0.02
4-6	67	
6-8	35	
8-10	28	

Table II shows that age group 2-4 years had 26 children, 4-6 years had 67, 6-8 years had 35 and 8-10 years had 28 children.

Table 3: Possible reasons for lead poisoning

Reasons	Number	P value
Thumb sucking	26	0.04
Use of colored toys	68	
Pets	34	
Absence of hand washing	65	
Use of herbal medications	35	
Pencil biting	82	

Table III, graph I shows that possible reasons seen in children were thumb sucking (26), use of colored toys (68), pets (34), absence of hand washing (65), use of herbal medications (35) and pencil biting (82). The difference was significant ($P < 0.05$).



Graph 2: Possible reasons for lead poisoning

Discussion

Before ACCLPP’s recommendation in May 2012, the level for which public health intervention was warranted for children aged <6 years was $\geq 10 \mu\text{g/dL}$. Since then, the reference level has shifted to $\geq 5 \mu\text{g/dL}$. For this report, elevated blood lead levels are defined as confirmed BLLs $\geq 10 \mu\text{g/dL}$. Data on children with BLLs $\geq 5 \mu\text{g/dL}$ also are reported because the change to a reference value did not occur until mid-2012 and federal funding from CDC to state and local health departments ended in September 2012 and resumed in late 2014 [6].

Studies suggest that the population groups at greatest risk of exposure are young children and workers involved with construction, mining, and manufacturing. This may be due

to greater gut absorption of lead in infants and young children than in adults [7]. The present study was conducted to assess lead level in children.

In present study, out of 156 patients, boys were 80 and girls were 76. We observed that age group 2-4 years had 26 children, 4-6 years had 67, 6-8 years had 35 and 8-10 years had 28 children. Needleman *et al* [8] in their study determined the prevalence and correlates of elevated blood lead level in children (6-144 months). A total of 260 children were enrolled. The prevalence of elevated blood lead level was 44.2%, seen mostly in children below 5 years of age. Old and deteriorating wall paints at home was found to be significantly associated with elevated levels.

We found that possible reasons seen in children were thumb sucking (26), use of colored toys (68), pets (34), absence of hand washing (65), use of herbal medications (35) and pencil biting (82). Reducing lead exposure from residential lead hazards, industrial sources, contaminated foods or water, and other consumer products is an effective way to prevent or control childhood lead exposure. Lead poisoning prevention education directed at hand-washing or dust control fails to reduce children’s blood lead concentrations. However, pediatricians and parents should be aware of measures to reduce the toxic effects of lead on children, including the promulgation of regulations to screen or test older housing units for lead hazards [9].

The primary sources of lead in water, which can be dissolved or particulate, consist of lead service lines, lead solder, and brass fittings that contain high concentrations of lead. Plumbing installed before 1986, the year a federal ban was issued on using lead pipe and lead solder and a maximum lead content of 8% by weight for brass plumbing was established, is more likely to contain higher concentrations of lead. Lead services lines that are being replaced, are undergoing maintenance, or are damaged can release particles of lead that can be ingested [10].

Conclusion

Lead poisoning in children is a serious issue. The possible reasons found was thumb sucking, use of colored toys, pets, absence of hand washing, use of herbal medications and pencil biting.

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