LEAD CONCENTRATION IN HUMANS RESIDING IN INDUSTRIAL AND NON-INDUSTRIAL AREAS OF DEWAS TOWN, INDIA

Chauhan P.1 and Khanna R.*2

1. Department of Zoology, Govt. STP Science collage, Dewas (INDIA)
2. Department of Zoology, Govt. Madhav Science College, Ujjain (INDIA)

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ABSTRACT
Population neighbouring industrial area of Dewas town of Madhya Pradesh, India are at increased health risk due to constant exposure to various potentially hazardous compounds released during industrial production activities. We have studied extent of environmental exposure to heavy metal lead by atomic absorption spectrophotometry method in residents of industrial area and compared our results with people residing in non-industrial area (control groups) of different age groups viz. 20-30 years, 30-40 years, 40-50 years, 50-60 years, 60-70 years and 70-80 years. Our results indicated that elevated lead concentrations were found in the serum of person residing in industrial area in comparison to control groups, though both the groups showed elevated lead concentration values in comparison to normal values.

Key Words: Dewas town, Industrial area, Environmental exposure, Lead concentration

INTRODUCTION
Dewas is an industrial town of Madhya Pradesh, India where leather tannery, pharmaceutical, soybean, textile etc. industries are located. Human population residing in the vicinity of these industries are constantly exposed to pollutants emitted by these, by inhaling them or by ingesting contaminated water and food. We have studied the concentration of pollutants i.e. lead in human waste serum in the population residing near to industrial area. For comparing our results we have considered people residing in non-industrial area, though not very far from the industrial complex of Dewas town. Studies done by Kampa et al. (2008)2 also reported that hazardous compounds released during industrial processing activities are responsible for health risks for neighbouring population as they face constant exposure to them. Although heavy metals exist naturally in the environment, their concentration in the soil, water, and air increases as a result of growing industrial emissions3 and their long-term ingestion causes accumulation in the human body.4 Although there are many studies that focus on occupational exposures to heavy metals5 but no study has ever done before with reference to pollution in Dewas town due to industries. The main sources of general lead exposure are industrial emissions, and food.6 Studies revealed that lead accumulated over time in the body can have harmful health effects, even at low concentration. Even low level of lead in body is linked to lower intelligence and academic achievement in children and is associated with various adverse health effects including lowering glomerular filtration rate and increase in blood pressure in adults.7,8

MATERIAL AND METHODS
For the evaluation of blood lead concentration, we randomly collected 60 serum samples 10 of each age groups of males i.e. 20-30 years, 30-40 years, 40-50 years, 50-60 years 60-70 and 70-80 years from population residing in industrial area .To compare our results we collected same number of blood samples of age groups as above from population residing...
in non-industrial area of Dewas town. All these samples were analyzed with a graphite furnace-atomic absorption spectrophotometer (GFAAS) method, and the mean values of lead concentrations were represented graphically in Fig. 1.

![Graph showing mean lead concentrations in human serum](image)

Fig. 1: The mean values of lead concentration in human serum

**RESULTS AND DISCUSSION**

Lead concentrations in all the serum samples showed higher values than normal (5 microgram/dL) irrespective of the industrial or non-industrial regions. These results are very alarming for the residents of the town as they indicate severe conditions of air pollution due to industrialization in larger periphery with reference to locations of industries. Persons residing in the heavily polluted industrial area are mostly the employees of leather tannery, textile industries etc., which are the major sources of hazardous pollutants and exposed for longer time at their workplaces. This may be one of the reasons that age group 30-40 years showed highest values of lead in their serum. Also equal toxicity of lead is seen in the age group 70-80 year’s persons residing in the industrial region. Higher values of lead even in older persons support the investigations done by other workers that lead get excreted from the body in longer time durations but constant and chronic exposure conditions causes its deposition in long bones of the body and create number of pathological problems. The hazardous effluents of these industries contain number of chemicals and dyes used in processing steps. The pigments contain lead and the black smokes generated by these industries are polluting the air of whole town though intensity of pollutants may vary in different areas. Comparative low values of lead concentrations reflect degree of exposure to pollution but values in all the groups are the indicators of long-time exposure to lead. These are the biomarkers of many pathological conditions like anaemia, increase in blood pressure, mainly in old and middle aged people. Severe damage to the brain and kidneys, both in adults and children, were found to be linked to exposure to heavy lead levels resulting in death.

**CONCLUSION**

Investigations through light on the alarming conditions of Dewas town. Though the town has separate industrial complex but the hazardous wastes generated by industries are polluting air water and soil of the town. People living in the vicinity of industries are in constant exposure to pollutants but people of distant non-industrial areas are also found to posses raised lead concentrations in their serum.

**REFERENCES**