HUMAN ENVIRONMENTAL CONTROL: LEAD LEVELS IN BLOOD

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Clean atmosphere is a basic need for proper health. Persons living along roads having heavy traffic are affected by smoke emitting from various types of vehicles. Lead compounds (lead tetra alkyls) used in petrol as anti knocking agents are oxidised in internal combustion engines and produce toxic fumes.[1] These toxic compoundsare inhaled and consumed as a result of fall out from the vehicle exhausts on nearby fruit croPs.[2] Elevation of blood lead levels beyond the safe limits results in inactivation of sulphur containing enzymes and neurological abnormalities. This study reports blood lead levels in subjects in clean and congested areas of the city and suburbs.

SUBJECrS, METHODS AND RESULTS

Blood samples were collected from persons living or working in clean (10) or in light (16) medium (17) or heavy (17) traffic areas. Age, marital status and duration of stay in the area were recorded. Five milliliters of heparinised blood from each individual was centrifuged at 3000 ppm for 5 minutes and plasma was stored in clean plastic bottles at — 20°C. In a 25 ml conical flask 1 ml of plasma was digested with 5 ml nitric acid for 30 minutes. Then 8 ml of nitric acid and perchlorie acid mixture (1: 1) was added and heated at 300°C for 60 minutes till approximately 2 ml of clear fluid was obtained. The digested plasma was transferred to a 5 ml volumetric flask. The other flask was rinsed with water to wash remaining plasma. The final volume was made to 5 ml with water. VARIAN 1475 ABD atomic absorption spectrophotometer was used for the estimation of lead.

TABLE – Comparative Lead concentration in the Blood of Persons living in different Atmosphere.

S.No.		Atmosphere	No. of persons	Mean (lead concentration) in blood	People having lead more than 0.8 ppm (0.8-1.2 ppm)	People having lead more than 1.2 ppm	Confidence interval (ppm)
1.		Clean atmosphere	10	0.14 ppm	Nil	Nil	0.065 to 0.215
2.	(i)	Polluted atmosphere light traffic	16	0.52 "	"	"	0.48 to 0.56
3.	(ii)	Polluted atmosphere of medium traffic	17	0.66 "	6.0%*	"	0.55 to 0.77
4.	(iii)	Polluted atmosphere of heavy traffic.	17	1.02 "	29%*	35 %*	0.87 to 1.17

i. Light traffic area. The persons living in the area, having less traffic are included in light traffic area.

ii. Medium traffic area: The persons living or working in heavy traffic area are included in medium traffic area.

iii. Heavy traffic area: The persons living as well as working in heavy traffic area are included in heavy traffic area.

Permissible lead level = less than 0.4 ppm

Excessive lead level = 0.8 to 1.2 ppm (but not associated with clinical abnormalities)

Toxic lead level = above than 1.2 ppm

* Percentage is among those persons living or working in this particular area.

The table shows the plasma lead levels in people living in clean and polluted areas. Plasma lead levels varied from 0.14 - 0.4 ppm in persons living in clean areas. All individuals living in light traffic areas had lead levels below and only 6% from medium traffic area above 0.8 ppm. None of the latter group had levels more than 1.2 ppm. Lead levels of those living in heavily polluted areas varied from 0.64 - 1.6 ppm and only 35% had levels above 1.2 ppm.

COMMENTS

Lead levels in the atmosphere are comparatively higher in urban areas under the peak traffic conditions than in the rural areas[3] - Preliminary observations reported in this study indicate alarming atmospheric pollution. It is therefore necessary to formulate a strategy for prevention of atmospheric pollution and determination of lead levels in blood donors, people working in industries using lead compounds, and the fish ponds, crops and water channels in heavy traffic areas.

REFERENCES

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