

Estimation of Lead in Blood Samples of Some Gas Station Workers

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Abstract: Estimating the element of lead in blood samples of some gas station workers in Al-Shamiya District, Al-Qadisiyah Governorate, Iraq. Heavy elements are found in abundance in nature, where they are released through geochemical cycles into the environment, and high concentrations of heavy elements in the aquatic environment represent a danger to living organisms. Due to the ability of these organisms to accumulate these elements inside their bodies, and their concentration, what may cause a defect in their vital functions, in addition to the transmission of these elements through the food chains of the human being, causing him a lot of health damage. This research aims to estimate the concentration of lead in the whole blood of gas station workers and to study the relationship between its concentrations and the duration of work in the stations, as well as compare these concentrations.

Keywords: Gas station, pollution, human, Al-Qadisiyah

Introduction

Lead is a toxic mineral that is found naturally in the earth's crust. Its widespread use has resulted in widespread pollution of the environment, human exposure to its damage, and major public health problems in many parts of the world. An important source of environmental pollution is mining, smelting, manufacturing and recycling activities, and the continued use of leaded paint and gasoline in some countries. More than three quarters of the world's consumption of lead is for the purpose of manufacturing lead-acid batteries for cars, but it is also used in several other products, such as dyes, paints, welding, stained glass, crystal vessels, ammunition, glazed ceramics, jewelry, toys, as well as in some cosmetics and traditional medicines. It may contain lead, drinking water transported by pipes made of lead or connected to each other by lead soldering. Most of the lead in the world, used for commercial purposes, is now sourced from the recycling process. People can be exposed to lead from both occupational and environmental sources, primarily through the following [1]:

Inhalation of lead particles from burning lead-containing materials, such as during smelting, informal recycling, stripping of lead paint, and use of leaded gasoline;

Inhaling lead contaminated dust, drinking water (carried by lead tubes), and eating food (kept in containers made of glazed lead or welded with lead). The organization has identified lead as one of ten chemicals that raise a fundamental public health concern, and that member states must take measures to protect the health of workers, children and women of childbearing age [2]. WHO is currently developing guidelines on the prevention and management of lead poisoning, which will provide policy-makers, public health authorities and health professionals with evidence-based guidance on measures they can take to protect the health of children and adults from exposure to lead.

Materials and Methods

Chemicals

1- Nitric Acid 2- Perchloric Acid 3- Hydrogen Peroxide

Blood samples were collected for volunteer workers from gas stations in the district of Shahamiya (Al-Shamiya governmental Station-Al-Asadi National Station-Al-Sunbula Al-Thahabia national station).

3 ml of blood were withdrawn with a syringe and placed in a 50 ml glass beaker and 15 ml of the digester (a mixture of nitric acid and perchloric acid in a ratio of 3: 1) and 6 ml of hydrogen peroxide were added in three stages. Each stage, 5 ml of the digester and 2 ml of hydrogen peroxide were added [3].

Results and Discussion

Table (1) represents lead values according to age. The highest value was 0.093 and the lowest value was 0.0556.

Table (1) lead concentrations (ppm)

Number	Concentration	Age
1	0.0614	15
2	0.0556	17
3	0.057	24

4	0.093	25
5	0.062	25
6	0.0556	29
7	0.0636	30
8	0.0604	32
9	0.062	34
10	0.057	38
11	0.0674	41
12	0.063	41
13	0.0556	42
14	0.068	43
15	0.0604	43
16	0.0578	43
17	0.0662	52
18	0.0626	54
19	0.0566	54

Table (2) represents the lead values according to the period of work in the station (since appointment), the highest value was 0.093 and the lowest value was 0.0556.

Table (2) Period of work and Pb concentration

Number	Period of Work (Month)	Concentration
1	2	0.0614
2	1	0.0578
3	2	0.0556
4	3	0.093
5	3	0.062
6	3	0.0556
7	4	0.0556
8	5	0.062
9	6	0.068
10	7	0.063
11	8	0.0604
12	9	0.0636
13	9	0.0674
14	11	0.0604
15	12	0.0578
16	14	0.0626
17	15	0.0566
18	15	0.0578
19	25	0.0662

Table (3) represents the lead values for smokers, the highest value was 0.093 and the lowest value was 0.0556.

Number	Smoker Age	Concentration
1	17	0.0556
2	25	0.093
3	30	0.0636
4	34	0.062
5	38	0.0578
6	42	0.0556
7	43	0.0604
8	52	0.0662
9	54	0.0626

10	54	0.0566
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The results showed significant differences between samples, as they were within the global permissible limit (0.05 ppm) [4]. This is due to the fact that the areas under study are located in open and agricultural areas in addition to the lack of congestion with vehicles contributed to the reduction of lead concentrations due to the occurrence of the dilution process by wind movement and the areas are not crowded [5].

Conclusions

Estimating the element of lead in blood samples of some gas station workers in Al-Shamiya District, Al-Qadisiyah Governorate. The results showed that Pb was within the global permissible limit (0.05 ppm). There is no any health effect for the worker in these area.

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References

1. <https://www.who.int/ar/news-room/fact-sheets/detail/lead-poisoning-and-health>
2. Laith Abdulmajeed Al-Rudainy. Blood Lead Level Among Fuel Station Workers. Oman Med J. 2010 Jul; 25(3): 208–211.
3. Arab Journal of Security Studies, Training, Vol. 32, Issue 65, Riyadh, 2016.
4. Laurette Hughes - Environmental Pollution - Ministry of Higher Education and Scientific Research - University of Baghdad, 1989.
5. https://www.who.int/ipcs/assessment/public_health/lead_blood.pdf