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Lead and Cadmium levels in Serum of patients with lung cancer compared with controls in Iraq

Furqan Abbas Tawil
Depsartment of sPhyssics /Faculty of Science/ University of Kerbala /Israq
*Corresponding author email: furqan.a@s.uokerbala.edu.iq

Shaymaa Awad Kadhim
Department osf Phsysics /Faculty of Science/ University of Kufa /Israq
Email: shaymaa.alshebly@uokufa.edu.iq

Abdalsattar Kareem Hashim
Depsartment of sPhyssics /Faculty of Science/ University of Kerbala /Israq
Email: abdalsattar.kareem@uokerbala.edu.iq

***Abstract*---**There is a clear interest in recent years in the trace element concentrations and heavy metals present in Human and knowing whether the concentration of these elements changes in malignant i.e., changes in them create a great deal of damage, like poisoning. The amounts of 65 samples of malignant lung cancer patients and 35 healthy person's volunteers were evaluated using atomic absorption spectroscopy flameless in this research. Therefore, its aim of the research was to find out whether the elements of lead and Cadmium have a relationship and an effect on lung cancer by studying the concentrations and treating them statistically. The result showed that concentration values mean of serum lead were the highest in the L. C patients male and the lowest in the healthy people male group (13.401909, 5.385385), while the results of the average values of serum Cadmium showed the highest in the L. C patients female group and the lowest in the healthy people male group (123.748867, 14.025250). where the p- value is less the 0.05 that mean the relation between concentration of groups is statistical significance.

***Keywords*---**lung cancer, trace elements, SPSS Program, atomic absorption spectroscopy, Iraq.

Introduction

Trace elements are elements that are necessary in little quantities fsor it continuation of humanity, and their loss from the organism results in death or severe dysfunction. Trace element concentrations in human tissues range from .01 to 100 mg/kg [1]. In fact, all the essential trace elements can be toxic to humans and animals if they are Food intake is large or lasts for a relatively long time[2]. The main distinction among trace minerals and heavy metals is that heavy metals are generally harmful at extremely low doses, whereas trace elements are not. Many trace elements have different roles based on their chemical composition or how they are synthesized and distributed throughout the body. Cadmium is released into the environment as a result of human activities, particularly industrial operations, and waste disposal [3]. Food is the primary source of cadmium exposure in humans, although tobacco smoke is also a significant source. Other issues caused by cadmium poisoning include cancer, cardiovascular disease, and hypertension. Cadmium is known to cause cancer in humans [3]. Lead has long been recognized as a hazardous substance. It is brought by by a variety of human actions. Humans are exposed to it through food and water.

Reproductive failure, encephalopathy, neurophysiological abnormalities, anemia, renal damage, and hypertension blood and poisoning are all symptoms of excessive lead exposure [4]. Ufuk et al., attempted to evaluate the link between certain mineral, trace element, and heavy metal levels in lung cancer patients by measuring serum levels of copper (Cu), lead (Pb), zinc (Zn), iron (Fe), cobalt (Co), cadmium (Cd), manganese (Mn), magnesium (Mg). the results showed that Cu, Pb, Zn, Fe, Mg, Co, Mn and Cd may have a role in lung cancer patients [5]. Xiaping and Qun., the metsa ansalysis revealed a link among serum copper concentrations and L.C risk. Serum copper concentrations were highest in patients with L.C relative to healthy people, indicating that external copper exposure may be a major risk for L.C development[6] . Katarzyna et al., Its goals of this study were to analyze the correlations between serum and whole blood Cu and Zn level and clinical, socioeconomic variables, and nutritional data, as well as to look into the link between Cu and Zn status and asll-casuse mortality in L.C. Higher serum Cu levels, Cu/Zn ratios, and whole blood Zn levels were shown to be associated with a lower risk of the all death in L.C patients [7]. This study aims to identify certain trace minerals in serum in Iraqi patients. Patients with L.C using atomic absorption spectroscopy technique and a study of the distribution of these elements compared to healthy group. This work contributes to an accurate conception of the possibility of monitoring One of the types of malignant diseases by linking the concentration of some trace minerals in the serum, as well as access to early detection.

Experimental Methods

Blood Samples were taken from the imam Hussein Center for Cancerous Tumors in Karbala Governorate. 65 lung cancer (L.C) patients and 35 healthy groups. the blood samples, they were taken by syringe from the people, then the dye was separated from the plasma by a centrifuge and stored in an Abendouf tube stored in a refrigerator prepared for measurement. where the serum samples were

digested according to the procedures [8]. Using atomic absorption spectrophotometry flameless, the blood serum was also digested to obtain the concentrations of lead, cadmium [9] .After preparing the samples, they were sent to the laboratory for the purpose of measuring lead and cadmium with the Flame Atomic Absorption Spectrophotometer 6300 (AAS) and before the measurement the device was calibrated for the elements as in the figures below.

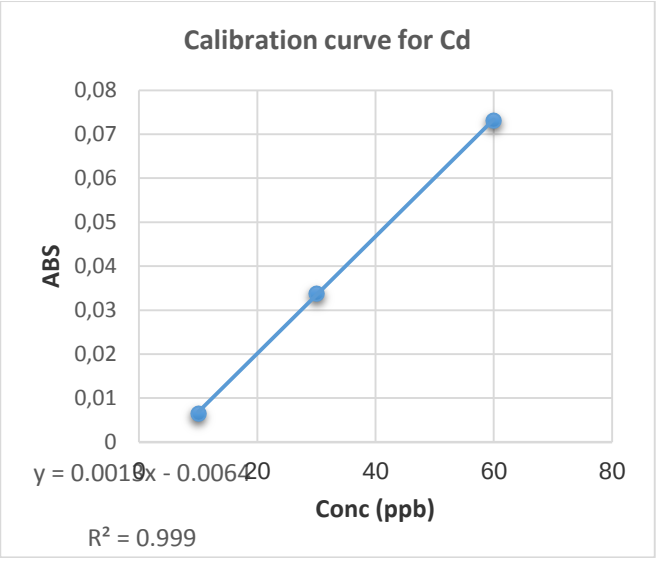

Figure 1. Calibration of the atomic absorption system for lead

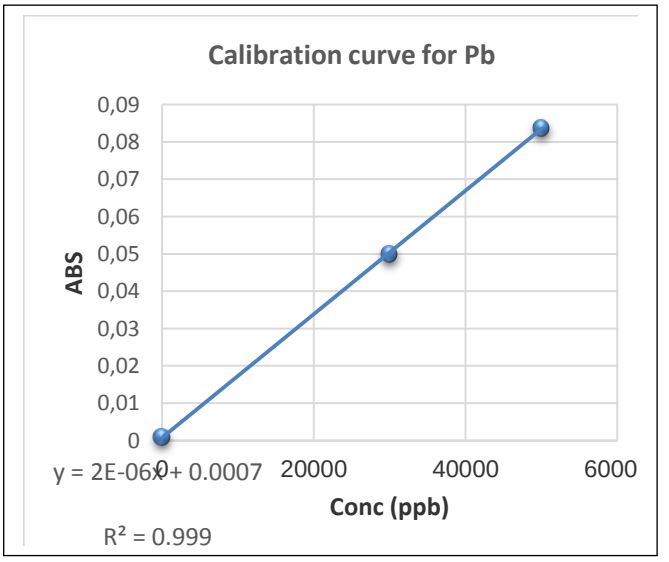

Figure 2. Calibration of the atomic absorption system for cadmium

Analytical statistics

The data was analyzed using the SsPSS Version 20 software, and the samples were tested independently, where if the p- value is less the 0.05 that mean the relation between concentration of groups is statistical significance but if large than 0.05 non significance value.

Result and Discussion

The study included two groups, the healthy group and the patients group for each genders, were the average age, p -value for each group was calculated as shown in Table 1.

Table 1
The descriptive patient information and healthy samples

sex		No.	mean±Std.Deviation	P value
M	healthy people	20	65.7000 ±12.34205	0.50
	L. C patients	35	59.0857 ±11.43362	
F	healthy people	15	47.2667 ± 7.29449	0.00
	L. C patients	30	59.8000 ±11.82750	

M: male, F: female, L.C: lung cancer.

Table 2
Comparison of the results statistically between samples of serum concentrations (ppb) lead for each group of healthy and patients

sex		No.	mean± Std. Deviation	P value
M	Healthy people	20	5.385385±9.2014991	.022
	L. C patients	35	13.401909± 15.9164449	
F	healthy people	15	8.305713± 7.9485756	.462
	L. C patients	30	10.285037±9.2448123	

Table 3
Comparison of the results statistically between samples of serum concentrations (ppb) cadmium for each group of healthy and patients

sex		No.	mean± Std. Deviation	(P value)
M	Healthy people	20	14.025250±21.6824085	.000
	L. C patients	35	60.875171± 20.7021283	
F	healthy people	15	21.410933± 15.4584732	.000
	L. C patients	30	123.748867±71.9148608	

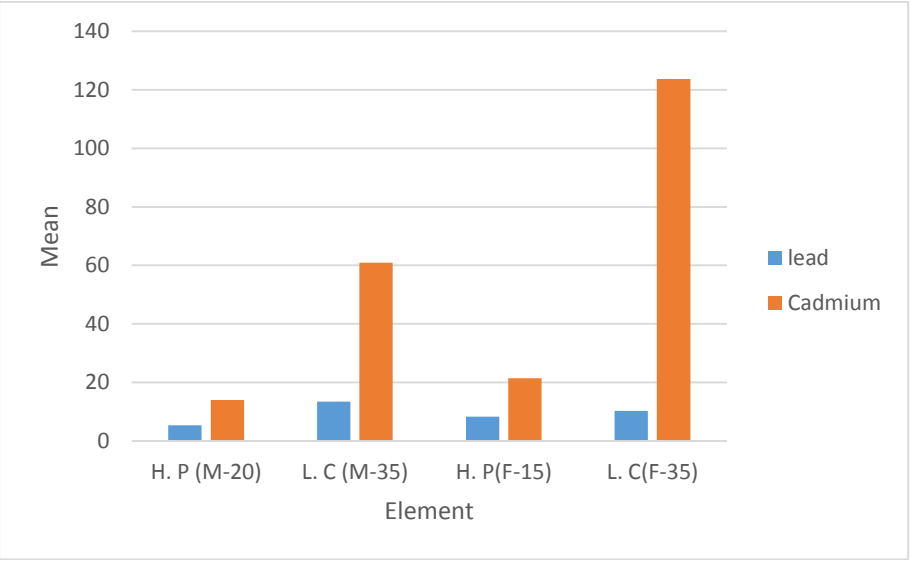

Figure 3. Comparison of serum concentrations (ppb) of Cd and Pb between healthy (male+ female) and L. C

From Table 2, 3, we note that concentration values of serum lead were the highest in the L. C patient's male and the lowest in the healthy people male group (13.401909, 5.385385), while the results of the average values of serum Cadmium showed the highest in the L. C patients female group and the lowest in the healthy people male group (123.748867, 14.025250). Where the p- value is less the 0.05 that mean the relation between concentration of groups is statistical significance. And as Figure 3 explain the comparison of serum concentrations (ppb) of Pb and Cd between healthy (male+ female) and L. C patient [10, 11] .

Table 4
The correlation factor between the Pb and Cd.

		Health female cadmium	lung cancer female cadmium	Health male cadmium	lung cancer male cadmium
Health female lead	Pearson Correlation	-.102-	-.125-	-.084-	-.013-
	Sig. (2-tailed)	0.718	0.658	0.767	0.963
lung cancer female lead	Pearson Correlation	0.125	-.105-	-.302-	0.002
	Sig. (2-tailed)	0.657	0.58	0.195	0.991
Health male lead	Pearson Correlation	0.303	-.054-	-.049-	-.224-
	Sig. (2-tailed)	0.272	0.82	0.838	0.343
lung cancer male lead	Pearson Correlation	-.368-	-.067-	-.144-	0.009
	Sig. (2-tailed)	0.177	0.727	0.545	0.958

From the table 4, the results of the Pearson factor were documented to find out the strength of the relationship among the studied ratios of the two groups of lung cancer and healthy people, Pearson correlation was low whether positive or negative and statistically significant between lung cancer male lead and (Health female cadmium). Finally, Pearson's correlation was negligible whether positive or negative, among the remaining values. where if the p- value is less the 0.05 that mean the relation between concentration of groups is statistical significance but if large than 0.05 non significance value[12] .

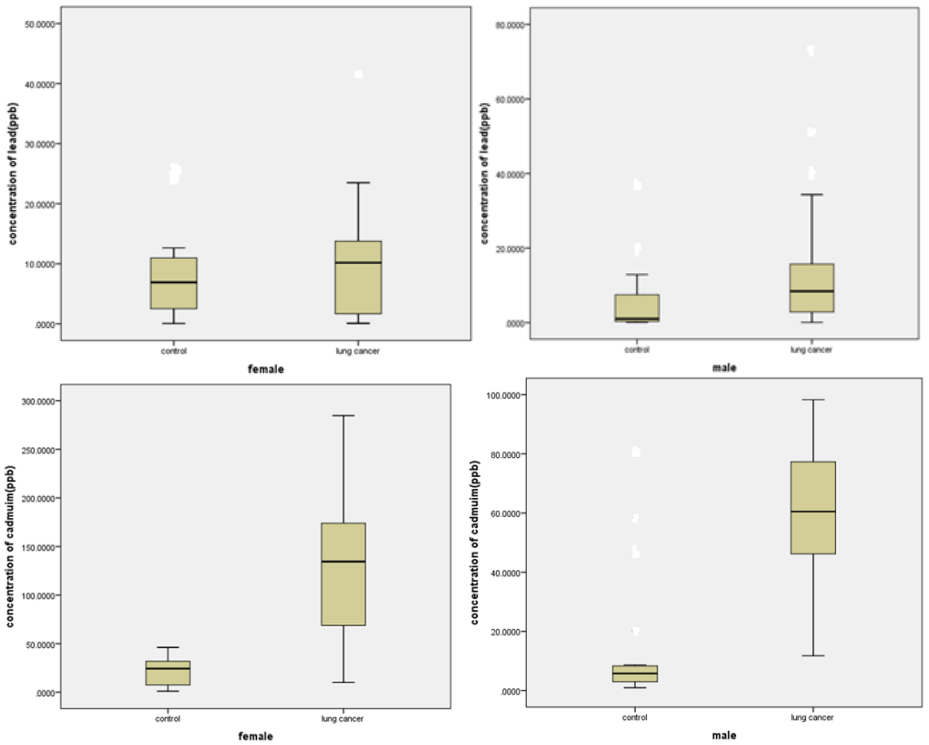

Figure 3. Serum concentrations of lead, Cadmium (PPb) for lung cancer patients and controls for each group

From figure 3 the findings of this investigation revealed that serum lead and Cadmium levels did not differ substantially between male and female L.C patients and healthy people.

Conclusion

Some international studies indicated a qualitative change in the concentration certain trace minerals in L.C patients and studies showed the presence of such changes in blood serum. lead concentration in patients were generally loswer than in healthy subjects and for all samples taken and were also low in relation to cadmium. the Pearson factor were documented to find out the strength of the relationship among the studied ratios of the two groups of lung cancer and healthy people, Pearson correlation was low whether positive or negative and statistically significant, we noticed that our results are consistent with

international studies. This conclusion depending on the concentration of the elements may be important in the knowledge of lung cancers and its causes more broadly. We also referred to a mechanism in the theoretical side of the research, and this is what was observed when treating the concentrations statistically.

Acknowledgments

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References

1. Gupta, U.C. and S.C. Gupta, Trace element toxicity relationships to crop production and livestock and human health: implications for management. Communications in Soil Science and Plant Analysis, 1998. 29(11-14): p. 1491-1522.
2. Underwood, E., Trace elements in human and animal nutrition. 2012: Elsevier.
3. World Health Organization. 1992. Environmental Health Criteria 134—
4. Cadmium. Geneva: WHO.
5. World Health Organization. 1995. Environmental Health Criteria 165—Inorganic Lead. Geneva: WHO.
6. COBANOGLU, Ufuk, et al. Some mineral, trace element and heavy metal concentrations in lung cancer. Asian Pacific journal of cancer prevention: APJCP, 2010, 11.5: 1383-1388
7. Yuzhalin, A. and A. Kutikhin, Interleukins in cancer biology: their heterogeneous role. 2014: Academic Press.
8. Martínez-Peinado, M., et al., Serum zinc and copper concentrations and ratios in cirrhotic patients: correlation with severity index. Nutricion hospitalaria, 2018. 35(3): p. 627-632.
9. Alshebly, S.A.K., et al. Serum levels of lead, cadmium and silver in patients with breast cancer compared with healthy females in Iraq. in AIP Conference Proceedings. 2019. AIP Publishing LLC.
10. Silvestre, M., et al., Copper, iron and zinc determinations in human milk using FAAS with microwave digestion. Food Chemistry, 2000. 68(1): p. 95-99.
11. Zhang, X. and Q. Yang, Association between serum copper levels and lung cancer risk: A meta-analysis. Journal of International Medical Research, 2018. 46(12): p. 4863-4873.
12. Wang, Y., et al., Association between serum zinc levels and lung cancer: a meta-analysis of observational studies. World Journal of Surgical Oncology, 2019. 17(1): p. 1-8.
13. Cobanoglu, U., et al., Some mineral, trace element and heavy metal concentrations in lung cancer. Asian Pacific journal of cancer prevention: APJCP, 2010. 11(5): p. 1383-1388.