

Cadmium and Nickel Concentrations in Urine from Patients with Lung Cancer Compared with Controls in Iraq

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Abstract

In recent years, human concentrations of trace elements and heavy metals have received great attention. It can be noted that many diseases can occur as a result of the increase or decrease in these elements, such as obesity. In addition, a sample of 50 identified lung cancer patients was compared with 20 healthy volunteers. The study aims to show the relationship between cadmium and nickel, to demonstrate how they contribute to the increased risk of lung cancer. To achieve the aim of the study, the researcher used the flameless atomic absorption technique in order to limit the concentrations and treat them.

Keywords: lung cancer, trace basics, Cadmium, Nickel, SPSS Program, atomic preoccupation spectroscopy, Iraq.

Introduction

Trace basics can be defined as materials or essentials necessary to maintain the life of an organism. But, the organism needs it in small or very small quantities, because its decrease or disappearance can cause a malfunction in the body's functions or the death of the organism. Therefore, the average concentration of these elements ranges from 0.01 to 100 mg/kg. Moreover, Studies have shown that nickel, sulfide and silicate minerals are more prevalent in the earth's crust by 0.01%. Due to weathering and volcanic factors, the distribution of nickel is at varying levels. Therefore, metallic nickel is used in various industries and applications such as electroplating, ceramics, batteries, foundries, catalysts, and others. The main difference between heavy metals and trace rudiments can be shown, which is that the average concentrations of heavy metals are low, and they are deadly substances. As for the trace basics, their focus rate is also low, but they are not non-toxic substances. Therefore, trace elements can be incorporated into multiple actions by classifying them and putting them into body fluids. Thus, these elements have been used as biomarkers in order to highlight their role in increasing the risk of cancer, which is still not resolved. About 19 of these

substances have been classified as useful and necessary for human life according to the World Health Organization, such as nickel, selenium, cadmium, arsenic, and others.

Furthermore, the tasks of many mineral proteins and enzymes are linked by trace elements, and it has also shows a significant part in adaptable gene manifestation, and is crucial for growth, defense, blood cell production, and bone strength [10]. According to some beliefs, the colorectal cancer is triggered by a difficult contact between inherited vulnerability to contagion with ecological issues, as recognized by heredities, investigational and epidemiological readings [11]. Nearly, 75% of patients have neither a clear family history nor any known tendency [12]. According to the observational trainings have demonstrated that the growth of CRC can be connected to ecological issues such as high calorie intake, high consumption of red meat (especially if it has been overdone) [13], as well as high ingesting of soaked flabs, low feasting of fruits, extreme quantities of Alcohol, obesity, cigarette smoking, vegetables and fiber, and inactive routine [14]. A countless interest has placed on the analysis of weighty metals in human tissues recently, because these elements are played the role in biochemical and physiological processes [15]. The association among serum copper levels and lung cancer risk by meta-analysis, are presented by (Xiaping and Qun) (2018). As a result, the highest level goes to serum copper in patients with lung cancer compared with controls without lung cancer. The risk of lung cancer can be increased by the high serum copper levels, and the growth of lung cancer may be caused by the ecological copper contact [16]. Katarzyna et al. indicated that the goals of this potential troop reading were as follows: Firsly, showing the link between copper and zinc and their effect on increasing the risk of lung cancer, and secondly, (iii) to measure the contacts among serum and entire plasma Cu and Zn statue and clinical, sociodemographic, and nutritious data. Consequently, the results displayed that high levels of copper, especially copper and zinc, lead to an increased risk of death due to causes of lung cancer. Therefore, the aim of the study is to identify some trace elements in the urine of Iraqi patients, and the study focuses on the using of absorption spectroscopy by lung cancer patients to compare the distribution of these trace elements between sick and healthy people. Thus, this work also contributes to giving an accurate diagnosis by monitoring some malignant diseases through early detection and linking the absorption of trace basics in urine.

Experimental Methods

The Euphrates Middle Center for Cancerous Tumors in General Teaching Hospital in Najaf and Diwaniyah Governorate was the main source of samples under study. The researcher collected urine samples from 20 healthy and 50 lung cancer patients by storing them inside special tubes kept in a measurement refrigerator. According to the procedure, urine samples were digested by flameless spectroscopy technique in order

to obtain nickel and cadmium concentrations by atomic absorption 6300 (AAS). All of these elements have been calibrated in the device before measurement, as shown in the figure below.

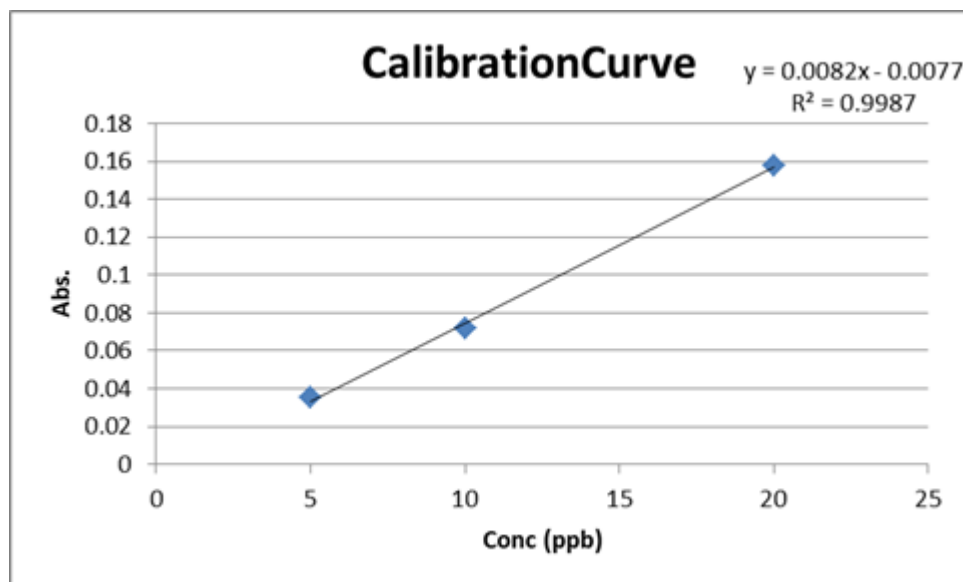


Figure 1. Calibration of the atomic absorption system for Nickel.

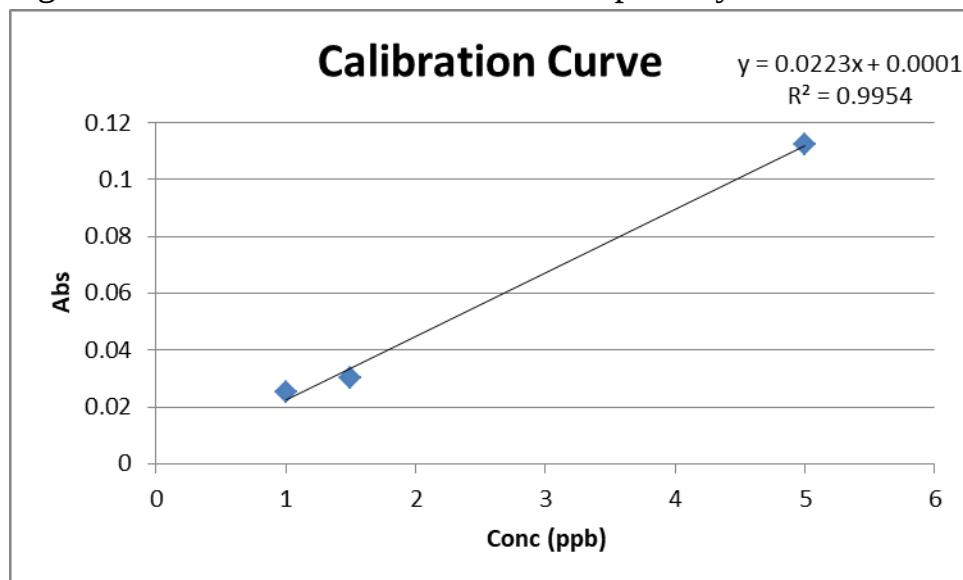


Figure 2. Calibration of the atomic absorption system for Cadmium.

Statistical Analysis

Data are analyzed according to The SPSS version 20 program, and Samples are tested by the autonomous test. Thus, according to the associations among focus of collections a numerical importance remains demonstrated where the p- value is less than 0.05, but if larger than 0.05 it is not a significant value.

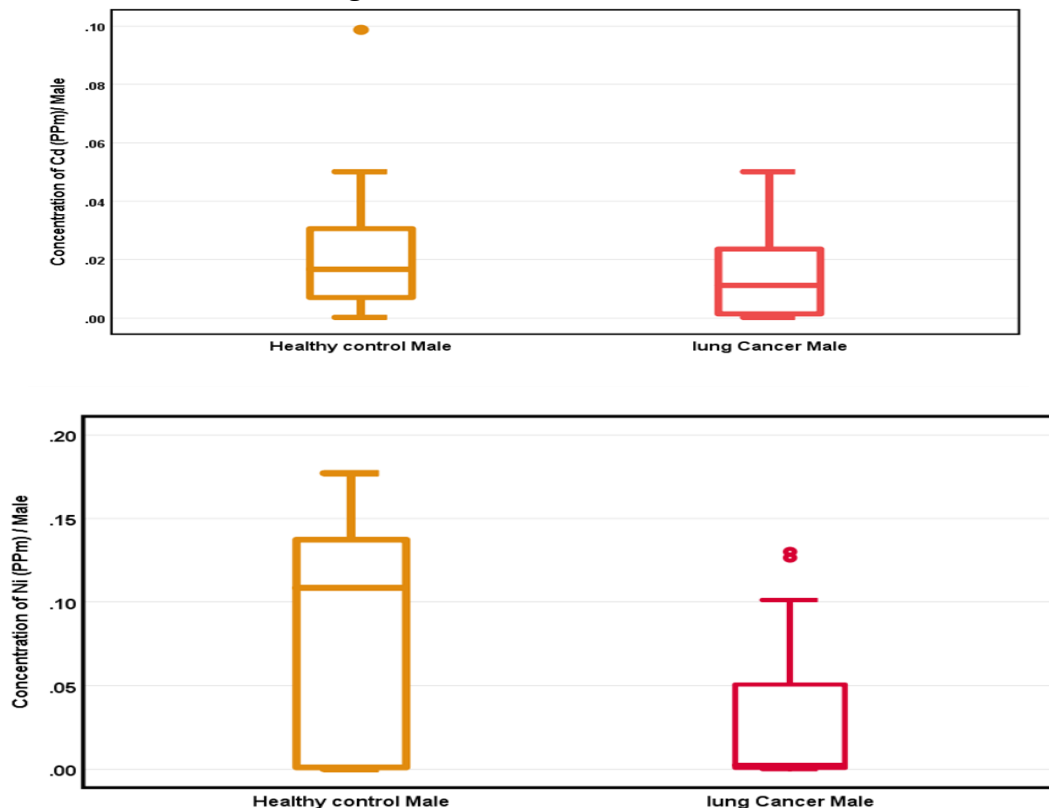
Results and Discussion

The healthy group and the patients group are tackled in this research (lung Cancer) for each genders, mean±Standard deviance for focus of cadmium and Ni (PPm), each collection is identified by p -value as exposed in Table 1.

Table 1. The descriptive data of patients and healthy samples for Cd and Ni trace elements.

sex	Studies groups	No.	Cd (PPm)		Ni (PPm)	
			mean ± Std .Deviation	P value	mean ±Std .Deviation	P value
M	healthy people	13	0.0225 ±0.0270	0.268	0.0776 ±0.0719	0.013
	lung Cancer	25	0.0148 ±0.0151		0.0289 ±0.0434	
F	healthy people	7	0.0128 ±0.0102	0.629	0.0498± 0.0510	0.349
	lung Cancer	25	0.0173 ±0.0234		0.0320 ±0.0414	

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



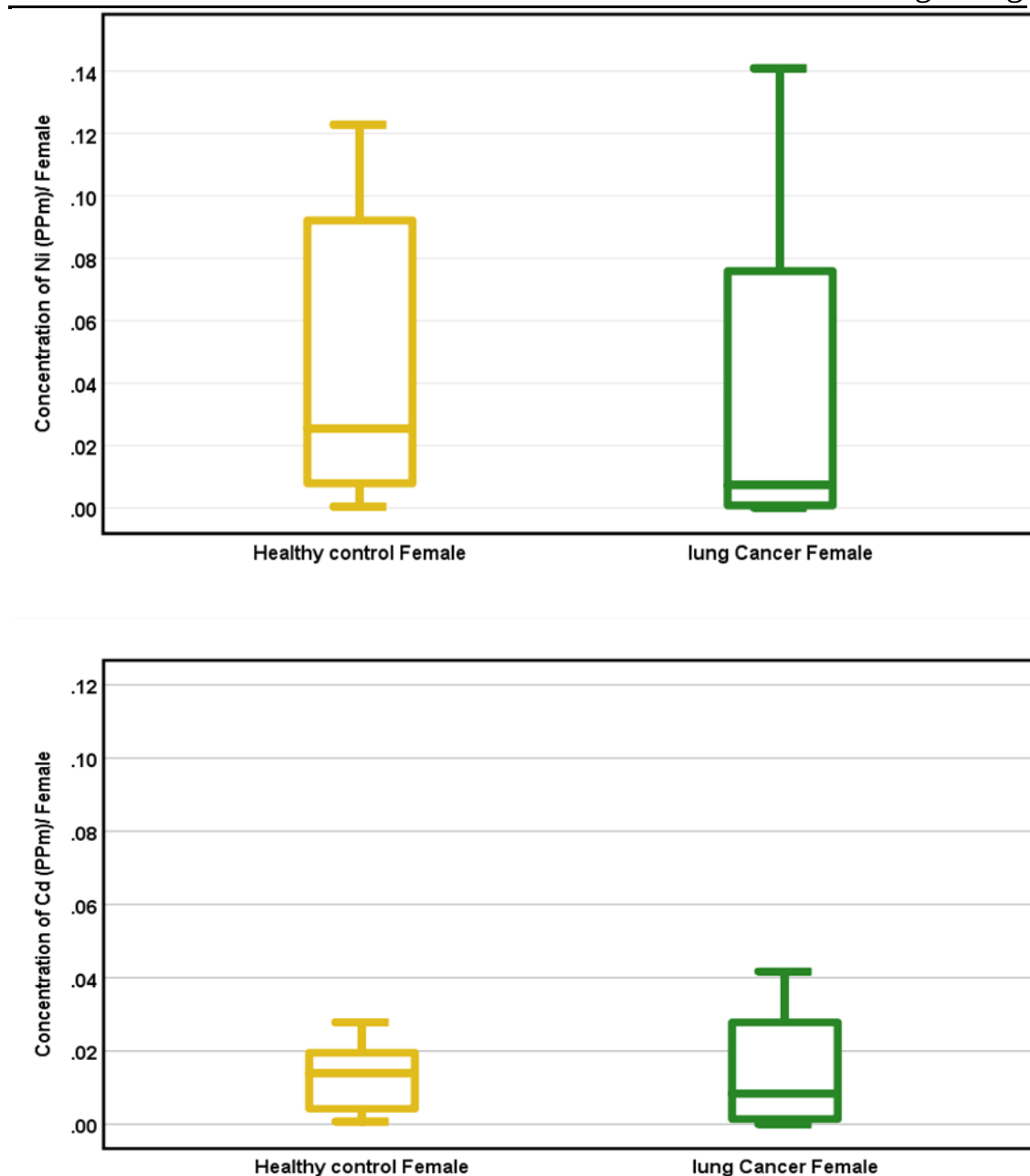


Figure3: Urine concentrations of Cadmium, Nickel for lung cancer patients and controls for each group.

The statistical study has shown, according to Table (1), healthy females have a higher rate of nickel in the urine, and the lowest value goes to L. The study also has exposed that the normal percentage of cadmium in the body is in the collection of females infected with C, while the results are higher in the collection L. Therefore, the cluster of sick males has a higher percentage, and lowest in the healthy female cluster. Thus,

the researcher suggested that there is a statistical significance among the clusters if the p value is less than 0.05, As exposed in Figure (3), the urine focuses varied among healthy and sick patients.

Conclusion

According to some global, a qualitative change in the focus of certain trace rudiments in Patients with lung cancer are presented the presence of such changes in urine. Healthy samples have higher levels of cadmium than sick subjects in all tokens. But, the percentage of nickel is low in healthy people. This conclusion may be based on the results of the large concentration of lung cancers and their causes. Thus, this is what is shown in the theoretical aspect and what was reached according to the statistical analysis.

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