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Work-related and Prostate cancer of man and woman in Mosul/Iraq

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Abstract--- *Prostate cancer was more common in men over the age of 65 years. There are 15% cases with positive family history of this disease worldwide. Prostate cancer was the second cause of death among the U.S. in men. Prostate cancer incidence was strongly related to age with the highest rates in older man. Globally millions of people were suffering from this disease. The aims of this study are to provide awareness about prostate cancer as well as an updated knowledge about the epidemiology and etiology. Factors which may deals with the in develop of prostate cancer includes smoking, heavy alcohol consumption, daily chemical exposure, radiation, sun exposure, and some viruses and bacteria. However daily exposure to the chemical play a big role in their disease but the mechanism still unknown. Dealing with the carcinogen should be with caution and it doesn't mean getting cancer after period time. It depends on what you were exposed to, how often you were exposed, and how much you were exposed to, among other things. An early link between cancer and a chemical was found in the late 1700s.whenan English physician noted that a large number of chimney sweeps had cancer of the scrotum due to exposure to soot, which contains chemicals known as polycyclic aromatic hydrocarbons. Since then, many more chemicals have been identified as known or suspected causes of cancer. Today, much of what we know about chemicals causing cancer in humans we had learned from workers exposed to chemicals at their jobs.*

This study was conducted in Mosul city in north of Iraq for healthy people working in the Department of Chemistry and Lifes Sciences of males and females for the period betwean (July 2011-May 2015)follow up was included in this study with three month interval to make the comparison and to know if there is regresses or not among the three periods with the compare carcogenic with the control group from persons not exposed to chemicals in there. The results of this study showed that there was a significant impact of exposure to chemicals and biological materials on the development and of prostatic cancer through a significant increase of serum tests during follow-up of people working in the field of chemistry and life sciences and symptoms may in some cases death to some people study there were a mortality between these chemical workers in this study.

Keywords--- *PSA, carcinogenic substances, workers deal with chemicals, prostatecancer*

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I. Introduction

Prostate gland is the male sexual gland which is present in front of the rectum and between the bladder and penis (1). Prostate cancer is the malignant cancer and second most frequent malignancy in men (second to skin cancer). Although the disease is present in many patients, but it is not causing any problem and will not responsible for their death. According to one study, incidence of prostate cancer in Iranian population is more as compared to other areas of Asia(2). Age is the major risk factor but there is also an increased risk in those with a family history of either prostatic or breast cancer. Median age is 72 years (3). African Americans have an increased risk of disease as well as increased rates of advanced disease(4). In UK 36% of cases were diagnosed in men aged 75 years and only 1% were diagnosed in the under 50s. Asian Americans are affected less common as compared to others. It is 2 to 3 times more in person whose brother or father has prostate cancer as compared to those who have no family history of prostate cancer. If a person has three immediate family members suffering from prostate cancer then there is 10 times more chance of prostate cancer as compared to person that has no family history of prostate cancer. High fat diet also increases the chance of this disease.

The PSA blood test and Digital Rectal Exam (DRE) can be used to detect prostate cancer when no symptoms are present. They can help catch the disease at an early stage when treatment is thought to be more effective and potentially has fewer side effects. During a PSA test, a small amount of blood is drawn from the arm, and the level of PSA, a protein produced by the prostate, is measured. PSA levels under 3.0 ng/mL are usually considered “normal.” However, the assessment of a “normal” PSA must take into account: The patient’s age , Prostate size , Previous PSA tests , Other medical conditions, such as prostatitic , Drugs that may artificially lower PSA, such as finasteride (Proscar or Propecia) or dutasteride (Avodart) and Infections and procedures involving the urinary tract that can elevate the PSA(5).

Chemicals can interact in a number of ways. If we consider two chemicals, they may act at a common site such as a receptor or an enzyme. In this case their actions may be additive if both activate the target, or occlusive if one activates and the other binds without activating or binds with a slow dissociation constant. However, many effects are more complex than simply binding to a receptor or enzyme and act through some combination of altering gene expression, changing levels of intracellular concentrations of ions, altering cellular metabolism or production of cellular regulators. Under these circumstances the effect of mixtures is more difficult to predict. In reality, few chemicals have only a single cellular target. Most act at multiple sites on different cell types or in some cases even at multiple targets within the same cell type. There may be quite different actions on the kidney, the liver, and the brain, each with a different disease-related outcome. The actions at each of these sites depend on the presence of genes, receptors, and cellular regulators in the specific cell types. When targets that regulate other organs and cells are affected (e.g., the thyroid or the beta cells of the pancreas), the impact of the chemical agent is much greater. Much of the contemporary concern about chemical mixtures stems from the possibility of compounds having synergistic, or more than additive, effects. We have a few examples of well-documented synergistic actions of environmental agents in humans. We have strong evidence that inhalation of radon progeny and current smoking have synergistic effects on the incidence of lung cancer (6).

Among the strongest correlations between exposure to endocrine disruptors and negative outcomes are those related Reproductive growth, physiology, pathology. The prevalence has increased over the years Past 50 years for hormone-sensitive cancers (such as breast and prostate cancers), fertility inhibition, and puberty Early, sperm number, genital mutilation, and unbalanced sex ratios (7) are attributable, at least in part, to increased material Chemical and increasing exposure to it. Increased rates of early puberty in girls, although it contributes to many factors Including nourishment,

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distress and ethnicity, it may be due to exposure to chemicals causing endocrine disruption Estrogen , These estrogenic compounds are also associated with uterine fibroids, ovarian dysfunction, and decreased Fertility in humans and animal models (8) associated with decreased egg quality and other aspects of the biological and safety of the egg in patients who are seeking fertility treatment ,which are parallel effects Exactly that of the animal models ,Danish women under the age of forty working in industry Plastic is more likely to get fertilization help from women of the same age and not exposed to these substances For men, the number of spermatozoa has decreased to as much as 50% over the past half century in some regions Many chemicals, most notably phthalates, are associated with a variety of negative effects on the urinary system Male genitalia, including testicles, hypospadias, prostate diseases and testicular cancer(9)

II. Material and Methods

One- hundred of healthy people working in the Department of Chemistry and Life Sciences of males and females and one- hundred of healthy persons are not within the workers in the former fieldsduring the study period from (July 2011-may 2015) in Mosul province in north of Iraq . the PSA level was measurement by ImmunoEnzymometric Assay (ST AIA-PACK OVCA) every two months for six month to follow up the each cases. .Serum PSA were measured by the use of minividas , which was an automated test for use on (Tosoh device)in Oncology and Nuclear Medicine Specialist Hospital /Iraq instruments ,for the measurement of PSA antigenic determination in human serum using ELFA technique (Enzyme Linked Fluorescent Assay) using a kit purchased from biomereux Ltd.(10) (11).

Statistical analysis data were analyzed using (SPSS) program. The T test was used to identify the significant differences between the subjects within the study . all values in the study are expressed as mean ± SD . Differences between values were considered significant at $P \leq 0.05$.(12).

III. Result

The results of this study indicated that there were significant differences when comparing the three follow-up stages with each other, especially when comparing the second and third follow-up stages with the initial (first) collection stage in persons working in the chemistry and life sciences laboratories.

The results also indicated significant differences between groups of males and females during the follow-up stages. This gives an indication on the effect of chemicals on both sexes working in the field of chemicals compared with people outside this filed of work.As shown in Table (1)

Table1.PSA value for three follow up man and woman and statistic analyses

Follow	N	PSA mean( )	SD	T-value
1 male	22	1.494	0.268	.001
2 male	54	2.816	0.262	
1 female	14	0.920	0.052	.000
2 female	59	2.947	0.429	
1 male	22	1.494	0.268	0.000
3 male	40	4.502	0.813	

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1 female	14	0.920	0.052	0.000
3 female	30	4.823	0.981	
1 All	36	1.271	0.137	.000
2 All	136	2.593	0.419	
1 All	36	1.271	0.137	0.000
3 All	70	4.662	0.852	
1 male	36	1.377	0.023	.011
Control	18	1.013	0.064	
2 male	36	3.060	0.289	.000
Control	18	1.013	0.064	
3 male	40	4.502	0.813	0.000
Control	18	1.013	0.064	
1 female	58	.078	0.009	.203
Control	35	.068	0.009	
2 female	58	2.900	0.428	.000
Control	35	.068	0.009	
3 female	30	4.823	0.981	0.000
Control	35	.068	0.009	

The PSA level results in the population group(Males and females) who work outside the chemical field and are considered a control group for this study. These results are standard for PSA in Mosul city show in table(2).

Table 2. Stander PSA value in man and woman in Mosul-Iraq

control		statistic	Std.Error
Male n.69	mean	.7086	.11889
	Lower bound Upper bound	.4647 .9526	
	Std.Deviation	.62912	
	Min	.01	
	Mix	2.24	
	Range	2.23	
Female n.69	mean	.2765	.11390
	Lower bound Upper bound	.0463 .0567	
	Std.Deviation	.07200	
	Min	.01	
	Mix	4.16	
	Range	4.15	

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IV. Desiccation

The results of this study, there is a significant elevation in the level of PSA in the serum of people who work in the field of chemicals for the sections of chemistry and life sciences from both sexes, and in particular through the follow-up processes. This indicates the presence of a significant effect of chemicals on the human health where the results of recent research confirms the significant impact of chemicals and biological agents on many biochemical variables, which leads to an increase in risk factors for prostate cancer has been confirmed these cases through this study where the results confirmed the presence of infections among the study models of prostate cancer The studied cases were subjected to death during the study period.,This may due to deal with chemicals in terms of the occurrence of many types of cancer, especially prostate and lung cancer(13).

When chemicals enter the human body ,which absorbed in different ways (mouth / inhalation / skin / injection) and then turn into the rest of the tissues of the body and according to the nature of the material where the absorption depends on the physical nature of the chemical. It may occur during the passive transfer of materials or the active transfer of absorbed materials that pass through the blood and then to the liver and then they are distributed and transferred to the different tissues of the body and according to the nature of the chemical and the way it enters the body. (14). Carcinogenic chemicals wereit used by workers directly to alter and cause damage to the structure of DNA, where system enzymes (CYP 450) work to address the damage that may occur through metabolism in the first and second stages of this system, which depends on the susceptibility of those substances to The effect on the enzymatic system and its exposure period, as shown by recent research in this field (15).

As workers in the field of chemistry and life sciences are exposed on a daily basis to different chemicals and exposure is continuous, which leads to a significant increase in the possibility of various types of diseases, especially cancer, as is the case in prostate cancer, because most of the work of the enzymatic system (CYP 450) is in the network Endoplasmosis in the liver is more present and available, but it is less in the tissues (bladder / skin / kidneys / lungs), which raises the possibility of exposure of these organs to cancer. (16).

Where the enzyme system (CYP 450) provides effective mono oxygen that interacts with polar materials, some of which are carcinogenic, especially chemicals, and converts them to lipophilic substances, which in turn plays a major role in starting a stage of reactions with DNA and these interactions are rapid and sequential. Where these carcinogenic chemicals greatly affect the synthesis of proteins through several reactions (oxidation / nitriding / halogenation) which leads to an increase in the occurrence of mutations and genetic changes of DNA, and thus works to create large quantities of (Ros) and encourage the initiation and development of cancerous tumors, especially cancer Posters for people who deal with chemicals constantly, As the role of enzymes may work to activate a chemical and deactivate another substance, depending on the nature and composition of the substance(17).

The effects of chemicals differ depending on the nature of the person exposed to the materials where we found through this study that some individual cases there was a significant effect of the chemical through a significant rise in the value of (PSA) through follow-up which led to the death in number of cases involved in this study(18).

Chemicals can be divided according to their effect on the body into two main parts that are genotoxic and non-toxic to genes. The danger lies in the toxic materials through the direct effect on the genes of a person who is constantly exposed to

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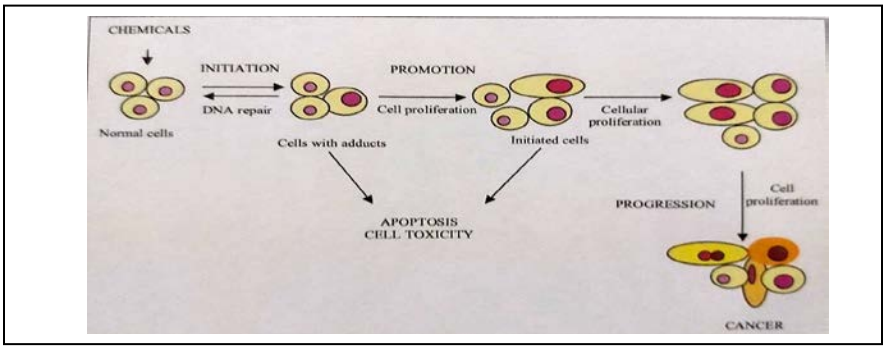
the material and then a disruption in the composition of cells in terms of changing the genetic information of the cell quantitatively and qualitatively (19) which leads to a change in the shape and function of the living cell, as shown in



As the effect of the materials begins by spreading through the cell membrane and then is metabolized to less polar compounds and enters the nucleus and interacts with nucleic acids (DNA,RNA) and works to change the proper structural shape and the formation of covalent bonds, which is the first step for the occurrence of cancer and in the event that this imbalance is not fixed in a way Direct and rapid and continued exposure to these substances that lead to an increase in the frequency of carcinogenic DNA, and thus the formation of carcinogenic genes, as each chemical substance causes a certain damage in the synthesis of nucleic acids and then the transmission of genetic mutations, and the process may occur as a result of replacing nucleotides with each other. Some of which leads to changes in the shape of cells and their basic functions, as in prostate cancer(20).

Where a number of research has indicated that prostate cancer may occur as a result of continuous exposure to harmful and carcinogenic chemicals as well as the result of an inflammation of the prostate and the reason is due to a decrease in the antigen (PSA) due to reductive inhibitors or chemicals which leads to a major disorder and swelling of the lymph nodes in cases This disease, especially in Iraq and most Asian countries, may lead to an increase in the proportion of prostate death, and this is what was observed in this study, especially the elderly (over 65 years). The situation increases to double (over 70 years) due to the increase in oxidative stress with age(21). Less than average with increased physical as observed low incidence of the disease in Europe and North America and why the activity is due to the strengthening of the immune system and reduce obesity and reduce the level of the hormonedramatically as well as the nature of affordable food. Recent studies have shown that the cause of the effect of chemicals on the body is due to an increase in the consumption of clotathione by continuing to be exposed to chemicals, which leads to a decrease in its level. It leads to a mutation and thus changes the structure of DNA and the occurrence of cancer cases inside the body(22).

The results of our study showed that the level of (PSA) rises significantly and significantly in women working in the field of chemistry and life sciences as shown in Table No.(1), as this was observed through follow-up, especially the difference between the third and first follow-up, which causes an increase in the time period of exposure to substances Chemical, where studies have shown that the level (PSA) can be expressed in multiple forms in gynecological tissue, for example the breast is a major organ capable of forming (PSA) and (PSA) has been diagnosed in both types of normal and abnormal breast tissue, Where endogens and progesterone through their receptors regulate (PSA) the breast tissue, where it was observed that the imbalance in the genes leads to high levels (PSA) in the blood serum, which are dangerous factors and indicators of the possibility of breast cancer, and this indicates the seriousness of dealing with chemicals.(23)

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Where recent research has shown that the term (female prostate gland) is small glands on the front side of the vagina and corresponding channels called sometimes (Seikin glands) or (Seikinducts) which are considered a major part of the female genital and reproductive system, Studies show that the occurrence of female prostate cancer is rare, but there are indications with age, the number of times of childhood , and cases of continuous hemorrhage in addition to a major cause, which is the constant exposure to dangerous and carcinogenic chemicals which affects the hormone progesterone, which is a very important and a trigger for cancer (Seikin gland) in the event of a chemical imbalance.(24)

Through this study, a gradual increase in the level of (PSA) was observed in women in the field of chemistry compared to women who are not working in the same field and this may be due to the change in hormone action and the inability of these enzymes to adapt to the change taking place, especially the portine enzyme , which leads to An increase (PSA) in females, where many recent studies have proven that a high level of females in Asian countries is undiagnosed, which leads to the spread of breast and prostate cancer due to social habits, lack of education and poverty so that the disease develops into advanced cases without early diagnosis(25).

Estrogen in the body (both male and female) has receptors for estrogen (ERs) found in many cells, In the brain, bones, blood vessels, and genital tissues. While estrogen can be better understood for its role, In childhood in females, it is an important male reproductive hormone, and is also involved in nerve function, bone growth and preservation, On it, cardiovascular functions, and many other functions. Natural estrogen does these things, after being released from the gonads (ovaries in females or testes in males), by attaching to estrogen receptors ERs in the target tissue(26)(27).

V. Conclusions

1-There is a significant effect of chemicals through continuous and continuous exposure to people working in the fields of chemistry and life sciences through a high level (PSA) and then increasing the risk factors for prostate cancer for men and women in general and breast cancer for women.

2- Periodic and continuous testing of levels (PSA) of chemical workers (man and women) must be performed for early diagnosis of cancer.

3-The presence of very serious and advanced cases of prostate cancer for men has led to death for a number of cases in this study as a result of a significant and significant increase in the value of (PSA) in the third follow-up.

4- This study show the high effect to the chemical in healthy person work in chemical and life science laboratory this may due to unrepaired damage in DNA can lead to mutations or changesin genes and mutation in certain genes can casus cancer especially (PSA) cancer.

5- The reproductive system function is to produce egg and sperm cells ,to nurture a developing fetus ,and to produce hormone for males it include the testicles ,seminal vesicles ,prostate gland, and the penis , for females it includes the uterus ,bladder ,vagina, fallopian tubes, ovaries, and the cervix .possible health effects of the reproductive system include decreased ability to have a body, increase body death ,increase birth defects ,and infertillty.

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