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The environmental influences on the incidence of cancer in AL-Muthana governate April 2010

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Abstract

Objectives

We tried to review the registered annual cancer cases in Al-Muthana and evaluate the environmental influences on our results.

Methods:

We reviewed the registered cancer cases in Iraq and in Al-Muthana in particular in 1976 - 2008, and we studied the cases in specific years before and after the last two wars against Iraq. We took into consideration the results in the southern provinces of Iraq and in few selected places in the world for comparison.

Results:

There is a clear increase in the annual registered cancer cases especially those of leukemia's in Al-Muthana as a part of Iraq in general and of southern provinces specially. The results go with those seen in other places in the world, which had been exposed to similar pollutants.

Conclusions:

There are many environmental pollutants in Al-Muthana governorate especially that of the depleted uranium (DU) in addition to others that are incriminated in the increase of cancer cases numbers like exposure to the electromagnetic effect of mobile phones towers, water contamination by factories waste product and sewage, smokes of cement and bricks factories and exposure to tobacco smoke directly and passively, and because many cancers can be prevented, we should search energetically for methods that make our governorate, as far as possible, clear from the environmental carcinogens.

Introduction

exposure to a wide variety of natural and man-made substances in the environment accounts for at least two-thirds of all the cases of cancer in the United States. These environmental factors include lifestyle choices like cigarette smoking, excessive alcohol consumption, poor diet, lack of exercise, excessive sunlight exposure, and sexual behavior that increases exposure to certain viruses. Other factors include exposure to certain medical drugs, hormones, radiation, viruses, bacteria and environmental chemicals that may be present in the air, water, food and work places. Life style factors such as diet, exercise and being overweight are thought to play a major role in the trends for breast and prostate cancers, and infection with helicobacter pylori bacterium is an important risk factor for stomach cancers. Recently, the rapid rise in the rate of colorectal cancer in Japan and China suggests an environmental cause such as lifestyle factors. Different environmental exposures are linked to specific kinds of cancers. For example, exposure to asbestos is linked primarily to lung cancer, whereas exposure to Benzedine, a chemical found in certain dyes is associated with bladder cancer. In contrast, smoking is linked to cancers of the lung, bladder, mouth, colon, kidney, throat, voice box, esophagus, lip, stomach, cervix, liver and pancreas.

Exposure to cancer-causing substances is only a part of what determines who will get cancer. For example, some people who smoke do not get lung cancer and not all women who are infected with human papilloma virus develop cervical cancer, Scientists, believe that there may be some protective, genes or other factors such as fruits and vegetables in the diet, that help prevent disease. Substances in the environment may cause gene alterations, which accumulate inside our cells. While many alterations have no effect on a person health, permanent changes in certain genes can lead to cancer.

Cigarette, cigar, and pipe smoking, chewing tobacco, snuff and exposure toenvironmental tobacco smoke are all linked to increased cancer risk. Heavy consumption of red and preserved meats, salt persevered foods probably increases the rise of colorectal and stomach cancers.

There is also evidence that a diet rich in fruits and vegetables may decrease the risks of esophageal, stomach and colorectal cancers. Being overweight or obese appears to be one of the most modifiable causes of cancer, after tobacco. Heavy drinkers have on increased risk of cancer, particularly among these who also smoke. Ultraviolet radiation from the sun, sunlamps or tanning beds causes premature aging of the skin and DNA damage that can lead to melanoma and other forms of skin cancer. Infection with a sexually transmitted virus (human papilloma virus) is the primary cause of cervical and anal cancer.
Hepatic B and C are major cause of liver cancer. Epstein-Barr virus infection is linked to some type of lymphoma; ionizing radiation can damage the DNA or gens inside the body, and can be carcinogen at every dose- level, not just at high doses. There is no threshold dose-level. **(Gofman 1990, chapters 18-21 + UNSCAR 1993, Annex F, especially p636 para. 84, p680 para 323 + NRPB 1995, especially pp.59-61 , p68 , p75 + pieree 1996,p.9, +Gotman 1996, chapter 45, + Riches 1997, p.519 + Hei 1997)**

.Ionizing radiation is a mutagen observed to induce virtually every kind of human cancer**.(Gofman 1969, p.4, +BEIR 1980, section 5 + UNSEAR 1988, p.460 para.394)**

.Pesticides like DDT and others have been found top carcinogenic **(http://www.aghealth.org)**

.Medical drugs used to treat cancer **(e.g, cyclophosphamide, chlorambucil, melphalan)** can cause second cancer. Immunosuppressant like cyclosporine and azothioprine are found to increase cancer risk.

.Estrogen used to treat symptoms of menopause and other gynecological conditions have been shown to increase the incidence of endometrial cancers, so also tamoxifen use. Several solvents used in paint thinners, paint and grease removers and in the dry cleaning

industry are likely to be cancer-causing in humans like benzene, carbon tetrachloride , muchloride, chloroform, and others.

.Exposure to various fibers, fine particles and dust like, Asbestos fibers, ceramic fibers, silica dust and wood dust are associated with increased cancer risks.

.Polycyclic aromatic hydrocarbons which are produced by burning carbon – containing compounds, also contained in gasoline, diesel exhaust and the by products of open fires can increase incidence of cancer in exposed persons.

.Metal compounds like Arsenics, Beryllium, Cadmium, Chromium, Lead and Nickel are known to be carcinogenic.

*** (U.S. department of health and human services publication no. 03-20392 printed August 2003)**

Methods:

We revised the literatures regarding the annual number of new cancer cases registered in 1976 – 2008 in Iraq, so also the annual number of new cases registered in Al-Muthana governorate- during the same period. Also we tried to study the cases in Al-Muthana during specific years especially those before 1991, the time of aggression against Iraq led by the American army and many years latter like 1993, 2000, 2005, and 2008 taking into consideration a second attack of war had occurred on April 2003. We tried to compare our results with other governorates like Al-Basra and Al-Najaf whom had been exposed to similar circumstances and again we revised the registered annual cases of cancer in the southern provinces whereas we are living in one of them during the years 1989, 1993 and 1994 and we concentrated on the percentage of leukemic cases in these years.

To make our study reasonably accepted we also compared our results with other countries, which had been exposed to environmental carcinogens also.

Results:

Table1

The annual number of new cancer cases registered in Iraq in 1976 – 2008 by sex (Results of Iraqi cancer registry centre, P.O Box: 2251 Al-WIYAH, Baghdad, Iraq)

Female		Male		No. of cases registered	**Year**
%	No.	%	No.		
38.93	1398	61.07	2193	3591	**1976**
39.47	1623	60.53	2488	4111	**1977**
39.92	1655	60.08	2490	4145	**1978**
40.19	1342	59.81	1997	3339	**1979**
39.46	1218	60.54	1869	3087	**1980**
41.69	1412	58.31	1975	3387	**1981**
40.25	1156	59.75	1716	2872	**1982**
42.23	1998	57.77	1776	3074	**1983**
43.61	1702	56.39	2201	3903	**1984**
42.77	1671	57.23	2236	3907	**1985**
44.90	2787	55.10	3420	6207	**1986**
42.71	2758	57.29	3699	6457	**1987**
43.59	2729	56.41	3532	6261	**1988**
45.00	3370	55.00	4111	7481	**1989**
45.00	3145	55.00	3913	7058	**1990**
45.37	2595	74.63	3125	5720	**1991**
44.46	3791	55.54	4735	8526	**1992**
45.32	3839	54.68	4632	8471	**1993**
45.66	3555	54.34	4230	7785	**1994**
45.34	3604	54.66	4344	7648	**1995**
46.58	3894	53.42	4466	8360	**1996**
47.38	4071	52.62	4521	8592	**1997**
47.15	4259	52.85	4774	9033	**1998**
49.02	4380	50.98	4556	8936	**1999**
50.63	5512	49.38	5376	10888	**2000**
49.31	6574	50.69	6758	13332	**2001**
50.20	7021	49.80	6964	13985	**2002**
49.34	5550	50.66	5698	11248	**2003**
48.17	6995	51.83	7525	14520	**2004**
50.53	7667	49.47	7505	15172	**2005**
51.54	7849	48.45	7377	15226	**2006**
53.16	7557	46.83	6656	14213	**2007**
53.91	7420	46.08	6342	13762	**2008**

Table 2*
The annual number of new cancer cases registered in Al-Muthana 1976 – 2008 by sex (Results of Iraqi cancer registry centre)

Year	No. of cases registered	Male		Female	
		No.	%	No.	%
1976					
1977					
1978					
1979					
1980					
1981					
1982					
1983					
1984					
1985					
1986					
1987	**72**	**39**		**33**	
1988					
1989	**104**				
1990					
1991					
1992					
1993	**165**				
1994					
1995	**111**				
1996	**99**				
1997	**109**				
1998	**113**				
1999	**124**				
2000	**256**				
2001	**221**				
2002	**233**				
2003	**165**				
2004	**215**				
2005	**191**				
2006	**242**				
2007	**216**				
2008	**236**				

*The missing data in the table related to the events, which happened after the two last wars against Iraq whereas many offices had been destroyed and many documents had been lost.

Table 3
We compared the registered cancer cases by Al-Muthana registry centre with those in Iraqi cancer registry centre in Baghdad in the years 2006, 2007 and 2008 to have an idea about how and why these differences occurred.

Year	Al-Muthana cancer cases registered by Al-Muthana centre	Al-Muthana cancer cases registered by Iraqi registry centre	% of leukemia
2006	99	242	10.74%
2007	119	216	8.33%
2008	112	236	6.35%

These differences related to many factors like:
We have no therapeutic centre so the patients go directed to other places where they can get treatment.
Many patients still are not trusting doctors in Samawa.
Most our doctors are not communicating in cancer cases registration.
Still we have shortage of facilities for the diagnosis so many doctors try to send patients to other centers for diagnosis and management.

Table 4
The annual number of new cancer cases registered in Al-Muthana, Al-Najaf, Al Basra provinces and the percentage of leukemia's in 1989, 1993, 2000, 2005, and 2008

Year	Al-Muthana		Al- Basra		Al- Najaf	
	Annual	leukemi	Annual	leukemi	Annual	leukemi

	total new cases	a	total new cases	a	total new cases	a
1989	104	3.8%	294	5.4%	198	6.5%
1993	165	10.9%	294	8.5%	387	11.3%
2000	256	21.48%	880	6.59%	562	10.14%
2005	151	11.92%	756	9.13%	744	6.45%
2008	236	6.35%	452	11.06%	400	15%

Table 5

The annual number of new cancer cases registered in the southern provinces and the percentage of leukemia's in 1989, 1993, 1994.

(Results of the Iraqi registry cancer centre 1992-1994 and re-printed and appraised by the international action centre, 39 west 14th street, room 206, New York, 10011)

Province	1989		1993		1994	
	Annual total new cases	leukemia	Annual total new cases	leukemia	Annual total new cases	leukemia
Wasit	226	5.3%	200	7.0%	203	7.4%
Meisan	134	4.5%	129	6.2%	121	5.8%
Qadissiya	176	6.8%	225	15.1%	185	13.0%
Thi-Qar	283	4.6%	312	8.7%	274	8.4%
Basra	294	5.4%	294	8.5%	230	6.1%
Muthana	104	3.8%	165	10.9%	112	8.0%

There is a study, done by a team of doctors in college of medicine, Basra University which accounted that there was 100% rise in the incidence of various forms of leukemia among children in 1999 compared to 1990. The corresponding rise for all malignancies among such children in 1999 compared to 1990 was 242%. These results were attributed to the exposure to depleted

Uranium used by the western allies during their aggression on Iraq in 1991
(Epidemiological trend of cancer in the south of Iraq, for the period 1976 – 1999, Dr. Ahmed Hardan; Dr. Abdul-Hafidh Al-Khazraji).
.To compare our results with countries which had been exposed to environmental carcinogens we had taken few examples.
1.Use of asbestos – containing soil in different places in the southeast of Turkey, was an important health problem because it was proved to be a cause of malignant pleural mestheliona and carcinoma of the bronchus. (U.S. national library of medicine, respiration, 2000; 67 (6); 610 – 4)
2.The incidence of thyroid cancer, in the Ukraine after the Chernobyl accident, following 1990, increased by 30% independent of age (radiation and environmental Biophysic, Springer Berlin. / Heidelberg, 0301- 634 x (print) 1432 – 2009 (online) volume 36, Number 3 / 1997. P 195 – 199.)
3.Acute external exposures to ionizing radiation among children in areas of the former Soviet Union (FSV) as aresult of the April 1986 accident in reactor vessel #4 of the Chernobyl Nuclear power plant, increased the risk of all types of leukemia, except chronic lymphocytic leukemia, the risk was greatest for acute myeloid leukemia (environmental health 2004; 3:12 online 2004, November 8: doi: 10. 1186 / 1476 – 069x – 3 – 12).
4.Myelodysplastic syndrome and different types of hemotopoietic malignancies including unusual chronic lymphoproliferative disorder – large granular lymphocyte leukemia had been diagnosed in Chernobyl clean - up workers, 1986-1987 (National Academy of Sciences of Ukraine, Kyiv 03022, Ukraine).
5.There are evidences accumulated in the last 15 years strongly indicate the strict dependency between post – Chernobyl radiation fall out and reported increase of thyroid tumors and autoimmune diseases. (Chernobyl: message for the 21th century, international congress series 1234; p 181).
6.In Sweden, there was a heavy rainfall 2 days after the event of Chernobyl in 1986, and during the period 1988-1999, 851 malignancies were recorded (environmental

effect on malignancy incidence, Amj/nd Med, 2006 mar; 49 (3) 159-86.).
7.In Japan: Inhabitants in both Nagasaki and Hiroshima were puzzled by the increase in leukemia incidence in both cities. Three years following the radiation exposure, leukemia rates peaked in Japan. (Marston 329) ; (Washington University in St. Louis, the atom bomb, Lindsey Anhalt, December 2000).
Although leukemia is a rare disease, accounting for only 4% of all cancer deaths in the World, leukemia deaths constitute about 20% of the total excess cancers reflected by a study in Japan. (Leukemia risks in Atomic – Bomb survivors: radiation effects research foundation, Online, 28 Nov. 2000).

On reviewing the medical literatures regarding the registered annual cancer cases in Iraq in 1976-2009 we saw that there was an increase in the total number progressively especially in the years that follow the wars of 1991 and 2003. Those results were applied to Al-Muthana governorate also. When we compared the findings with other provinces in Iraq especially Al-Najaf and AL- Basra and the southern provinces which had been exposed to similar circumstances in 1991 and 2003 we saw a remarkable increase in the total number of new cases yearly and in leukemia in particular. Those findings were similar to what had been registered in other countries which had been exposed to environmental carcinogens containing pollutants like what happened in Iraq.

Discussion:
Iraq is now of the world's most contaminated countries, say officials, (http://www.net/articles/2009/10/14/88009.html) because of remnants from Iraq's recent three wars, 1980s, the gulf war in 1991 and the U.S . Led invasion in 2003, coupled with the absence of adequate government control on emissions and industrial effluent. Environmental Minister Narmin Othman accounted that there are a number of environmental challenges in Iraq, one of them is water, air and soil contamination caused mainly by emissions from

cars and generators in crowded areas, unplanned use of chemical fertilizers, war remnants and bombing with depleted uranium (same references above). She also added that waste from heavy industry, tanning and paint factories as well as raw sewage and hospital waste being discharged into the country's two main rivers without government supervision.
In a 2005 publication, the U.N. environment program identified 311 sites in Iraq contaminated by depleted uranium and cleaning them up would require several years. (Same references above).

As far as Al- Muthana is concerned there are many pollutants which are incriminated for the increased incidence of registered cancer cases.

.First of all are the remnants from the Iraq's three recent wars.

.Second is the smoke which emerges from the cement factories.

.Third is the smoke which is elaborated from generators and bricks factories and from the old cars, so also from local rural places for briks manufacture which uses reduced black oil and the smoke is affecting the health of the villagers.

.Forth is the raw sewage which is poured directly through about 10 large pipes into Euphrates in addition to the Samawa general hospital waste product.

.Fifth is exposure to the tobacco smoke.

.6th is the electromagnetic pollution through effect of mobile phone towers.

.7th is the use of pesticides by farmers (IARC, 1997, U.S. Department of occupational hygiene 2007 51 (3): 261 – 268; doi: 10.1093 / annhyg / mem 003).

.Regarding the exposure to the depleted Uranium. There is no a strict pollution map in Al-Muthana because many places, and because of mines especially at the borders with Saudi Arabia and Al-Kuwait, had not been Surveyed, however there are places, which are proved to be contaminated with depleted Uranium (Al-Muthana environment directorate's report, no; 834, on 6/4/2010).

.There are many cement factories which are about one kilometer far from the centre of Samawa, the capital of the province, and not only there are many districts around but also there is a district with abundant of inhabitants within the boundaries of these factories. On inspection of the cancer map in the governorate, we can see that most of our cases are within the nearby regions especially those villagers living to the south of the factories, taking into consideration that the direction of the wind is northern in 90% of days.

.The cement factories had not been supplied with well authorized filter, so the people are exposed to the proven carcinogens contained in the smoke. carcinogenicity of cement smoke approved by the following references (IARC, 1997; U.S Department of labor, 2006), (Annals of Occupational Hygiene 2007 Volume 51, Number 3, Pp. 261-268; doi:10.1093/annhyg/mem003)

.Regarding the smoke exposure; the inhabitants in our province are exposed to the effect of the polycyclic aromatic hydrocarbons (PAHC). it`s main constituents which are proved to be highly carcinogens, through different ways, like exposure to smoke emerge from generators and old cars, but the major problem is the presence of around 35 bricks factories 20 kms to the south of Al-Samawa in addition to many small local places called (Koras) for producing bricks in the rural area and all are using the black reduced oil and elaborating a large amount of smoke with its contaminating effect to our environment.

.As far as the sewage disposal is concerned: Euphrates is traversing Samawa by about 2 kms and through this distance more than 10 large pipes are pouring sewage into

the river in addition to the waste of Samawa general hospital to the north of the city and many people in the villages are using the river for agriculture, their animal supply in addition to drinking by themselves, and by these ways the inhabitants are exposed to the sewage constituents like fecal matter, house hold chemicals, industrial carcinogens and heavy metals. the carcinogenic effect of sewage had been confirmed by many studies like: (Retrospective cohort mortality study of cancer among sewage plant workers (American Journal of industrial medicine, volume 19 issue, page 75-86, online 19 Jan 2007)., (Peek skill sewage leak addressed river keeper (http://www.River keeper.org/campaigns/stop-polluters/pollution-enforcement/peekskill:II-sew...).
.Our peoples are exposed to the carcinogens in tobacco products. Cigarette, pipe smoking, and exposure to environmental tobacco smoke are all linked to increased cancer risks.

.Many farmers are dealing with pesticides without strict meticulous precautions and by this way they are exposed to the carcinogenic effects of many of these materials.

.Lastly we are dealing with new problem in our province whereas so many mobile phone towers are founded above houses in between districts and this attitude makes the inhabitants vulnerable to the Electromagnetic pollution. Many cases of cancers had been registered in nearby places. This carcinogenic effect had been incriminated in many countries. Researches show higher magnetic fields are associated with greater risk of childhood leukemia, female breast cancer, and male breast cancer and brain tumor. (Electronmegnetic pollution::environmal and health concerns:Electronmegneticfiel...,page1of5
http://www.alive.com/32409692.php?
Subject_bread_cramb=169).

There is a family who was living in AL-Sadir district, where mobile phones tower had been established over the house and more than one type of malignancy had been discovered among the members however the family had

transferred to other province and no body agreed to give any additional information.

Conclusions:

There are many environmental pollutants in Al-Muthana governorate especially that of the depleted uranium (DU) in addition to others that are incriminated in the increase of cancer cases numbers like exposure to the electromagnetic effect of mobile phones towers, water contamination by factories waste product and sewage, smokes of cement and bricks factories and exposure to tobacco smoke directly and passively, and because many cancers can be prevented, we should search energetically for methods that make our governorate, as far as possible, clear from the environmental carcinogens.

There are helpful messages from cancer research which account that most of the cases of cancer have environmental causes and, in principle can be prevented **(U.S. National cancer institute, Bench marks, volume 4, issue 3, by Nancy Nelson, June 17, 2004).**

We in Al-Muthanna should concentrate on the following.

We should do a screening map for all districts in the governorate, regarding the contamination by depleted Uranium and all destroyed vehicles, weapons and remnants of the past three wars should be buried in safe places.

Cement factories should be supplied with chimneys filters and this issue is of a Para amount importance.

We should protect inhabitants from being exposed to the smoke produced by bricks factories as far as possible especially those workers and their families who are living within these places and inhibit establishing local small factories in the villages (koras) which are using black reduced oil and elaborating enormous amounts of smoke, so also we should inhibit using old cars.

We should avoid smoking and exposure to tobacco smoke and encourage people to get rid of this bad habit.

We should establish a good sewage disposal system.

Farmers should be trained well about how to use pesticides under strict precautions.

We should act against institution of mobile phone towers over houses so as to reduce contamination of the inhabitants by electromagnet pollution.
Because many people are infected or being carries for hepatitis B surface Antigen (HBS-Ag) and because those with chronic B hepatitis are highly vulnerable for hepatocellular carcinoma, we should establish a strict policy for vaccination of neonates in addition to the triple vaccine and for those who are highly susceptible for infection.

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المؤثرات البيئية على حدوث الحالات السرطانية في محافظة المثنى
نيسان 2010

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الأهداف
قمنا في هذه الدراسة باستطلاع الحالات السرطانية المسجلة سنويا في محافظة المثنى ودرسنا المؤثرات البيئية على نسب تلك الحالات.
الطرق المستعملة
قمنا باستطلاع الحالات السرطانية المسجلة سنويا في العراق عامة وفي محافظة المثنى خاصة خلال السنوات الممتدة من سنة 1976 ولغاية سنة 2008 وكذلك قمنا بدراسة تلك الحالات في السنوات قبل وبعد الحربين الأخيرتين ضد العراق آخذين بنظر الاعتبار النتائج في المحافظات الجنوبية وكذلك في أماكن مختلفة مختارة أخرى من العالم والتي تعرضت إلى ظروف مشابهة من اجل المقارنة.
النتائج
تبين إن هنالك ازدياد ملحوظ في الحالات السرطانية المسجلة سنويا وخاصة في حالات سرطان الدم في محافظة المثنى بشكل خاص باعتبارها من المحافظات الجنوبية وكجزء من العراق بشكل عام ولقد تماشت تلك النتائج مع ما هو مسجل في أماكن أخرى من العالم سبق وان تعرضت إلى ملوثات بيئية مشابهة.
الاستنتاج
هناك ملوثات بيئية متعددة في محافظة المثنى وخاصة فيما يتعلق الأمر بمادة اليورانيوم المنضب والتي استعملت في الأسلحة خلال الحربين الأخيرتين ضد العراق إضافة إلى ملوثات أخرى متهمة بازدياد الحالات السرطانية في المحافظة ومنها على سبيل المثال التلوث الكهرومغناطيسي لأبراج الاتصالات والمياه الآسنة وملوثات المصانع والمعامل من أبخرة ودخان إضافة إلى ازدياد التعرض إلى دخان السكائر المباشر والسلبي.
وبسبب كون نسبة كبيرة من الحالات السرطانية بالإمكان الوقاية من حدوثها لذا نرى لزاما علينا البحث وبشكل جاد عن الطرق الناجعة من اجل جعل المحافظة خالية من المؤثرات البيئية المسرطنة قدر الإمكان.