

# Study of The Possible Risk Factors Attributed to Breast

## Cancer in Alwasity Secondary School Kirkuk /Iraq

Dr. Karim W.Jameel <sup>1</sup>

director of health Kirkuk/Iraq and Co-operation with Kirkuk University college of science<sup>1</sup>

### ABSTRACT

Breast cancer is a common health problem affecting 20% of population. One of the risk factors affecting the causation of development of breast cancer is the environmental pollution by chemical and radiation . The presumptive theory lying behind is that ionizing radiation has genotoxic affect causing damage to DNA and mutation with gene alteration that increase the risk in both male and female The breast cancer risk includes being female ,getting older ,and DNA mutation .the study was carried out in Al-wasity secondary school to detect the existence of chemical and radiological remnants of stored weapons during the Iraqi war [2003] using inspector [1000] that detect harmful radiation as gamma rays ,neutron ,and radon ,it was clear that no radiation was detected above the normally and internationally allowed levels in the field of the study .so it is wise to look for other relevant risk factors that may be related to the causation of the ca.breast.

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### الملخص

مرض سرطان الثدي يعتبر من الامراض الشائعة والتي تصيب حوالي 20 % من النساء واحدة من العوامل الخطورة التي ترتبط بالإصابة هو التلوث البيئي بالمواد الكيميائية والاشعاعية فكرة الإصابة بالسرطان يكمن خلفها تأثير الاشعاع المتأين والذي يعمل على التحوير الجيني والذي يعمل على تحطيم الحامض النووي واحداث الطفرة الوراثية التي تزيد خطورة الإصابة في كلا الجنسين عوامل الخطورة تكمن في كون المريض انثى ,وزيادة العمر مع حدوث طفرات في الحامض النووي . تم اجراء دراسة في( ثانوية الواسطي للنبات ) لبيان وجود او عدم وجود المواد الكيميائية والاشعاعية الناتجة من خزن الاسلحة الامريكية في مخازن المدرسة طوال عام [2003] وذلك باستخدام جهاز ( inspector 1000 ) لكشف اشعة غاما ,والنيوترون وكذلك الرادون نتائج الفحوصات اظهرت عدم وجود اي مادة مضرّة من المذكورة اعلاه وكانت نسب تلك المواد ضمن النسب المسموحة بها عالميا .لذلك أصبح لزاما البحث عن اسباب اخرى لظهور بسرطان الثدي.

## 1. Introduction

It is well known that breast cancer represent a common health problem as it has affected (20%-30%) of women in developing countries and it is anticipated because the population in that regions are clearly aging and cancer in general is a disease of elderly.[1]]

The whole world is divided into low-risk and high –risk regions depended on the incidence of the condition; the developed countries being in the high risk category.[1]]

Brody et al, had revised literature on environmental pollutants and found a strong association,between chemicals as PAHs Poly chlorinated biphnols (PCBs) in association to cases of breast cancer. This hypothesis relied on several models explaining risk factors to develop the condition; of these factors were the human and laboratory studies evidences that support the role of the chemical acting either on genotoxic action ,hormonal responsive alteration of the mammary gland and tumor motions related to hormones.[2]]

Ionizing radiation is regarded one of the causes of genotoxic agents that damage DNA & cause mutation and gene alteration which may increase the risk in both gender[3]]

WHO has defined the risk factors as any attribute ,characteristics or exposure of an individual that increase the like hood of developing a disease or injury.

Regarding obesity and fatness ,it is documented that BMI above 25 kg/m<sup>2</sup> and central obesity associated with an increased risk of post menopausal breast cancer.[4]]

There has been a strong postulation that sex hormones being endogenous or exogenous had role in the increasing risk of breast cancer , in international pooled analysis illustrated that s in breast cancer risk was about 20% among women using oral contraceptive pills.[5]]

In-depth analysis of risk factors related to breast cancer ,it is likely that alteration in life style and the transition to westernized life style from old traditional onse is one ,of the attributable factors that expose women to higher risk of developing the disease .[6]]

Breast cancer risks [ the non-modifiable ] are being a women, getting older, and gene mutation effect as 5% to 10% of cancer are believed to be inherited from gene defects as BRCA1 and BRCA2,being the most common genes that are affected by mutation, although other genes had role in the causation as ATM,TP53,CHEK2 and PALM protein . [7]]

It is well documented from several studies that physical inactivity on its own is a risk factor for progression of breast cancer, and in adverse physical activity is regarded as one of the strong protective factors in prevention of breast cancer, the reason may be attributed to the reduction of total body fat, decline in free radical generation and immune system regulation, as most available data considers a strong evidence of the association between physical activity and post-menopausal breast cancer risk.[8]]

In addition to the previously mentioned risks ,smoking has an obvious effect on the development of cancer in general ,as its effects are caused by aromatic hydrocarbon in the composition of tobacco; according to American cancer society ,cancer prevention study II, it was found that a higher incidence of breast cancer in current and former smokers was clear that the newer smoker.[9]]

In Kurdistan, the rate was 168.9/100,000 at age 55-59 and declined to 57.3 at 60years and above,11.1 % had first degree family member with cancer , it was concluded that in Kurdish Iraqi, ca. breast is a condition among premenopausal women ,with multiple pregnancies ,but unfortunately clinical diagnoses was delayed among the studied group.[10]]

In Iraq during the period 2000-2009 years, -23,792 cases were registered among female  $\geq 15$  years ,the incidence was incremented from 26.6/100.1000 in 2000 to 31.51/100,000 in 2009 with an increase incidence in age group (40-49) (50-59) and 70 years and above .[11]]

In a preliminary study carried on the crude incidence of breast cancer, 22/100,000 female populations. The highest frequency was among age group [45-99] years. Among the previously mentioned study ,24.6 % of the patient, were illiterates 70.8% had medical consultation age and 35 % were diagnosed in the age of 45-54 years, 86.3 % were married .7% had first child over age 35 years , 8.5% were nulliparous, 46% had history of lactation.20.5 % had history of hormonal therapy,35.3% had family history and 18.5 % had relative with breast cancer.[12]]

In a study done in Iraq by Dr .nada Alwan , who studied ca .breast in relation to socio demographic and clinical pathogenic characteristic ,it was revealed that out of 5044 female attended the main referral training center for early detection of breast tumors in Baghdad,721[14.3%] were proved to have breast cancer[54.2%] were in their premenopausal age ,as [31.90] were among age group [40-49]years and [22.2 %]were young under 40years.[12]

## 2.Methodology

Regarding the proof or disproof the existence of the harmful radiological rays in selected area of the study a strong co-operation was performed by the ministry of higher education and scientific research ;the science college in Kirkuk, to start exploring and searching for the existence of radiation source in the school Building and nearby region.

a scientific committee of three assistant profs were invited to participate in the study or using a novel real time Instrument inspector 1000 a mirion technologies Product [CANBERRA ]

for application of neutron probe it is advisable to use in areas suspected to have high degree of radiation by directly detecting the gamma and neutron signals with additional alarm and warning thresholds.

The instrument mentioned above is un like that traditional han d held instruments with primitive ROI and analysis it applies full mathematical peak search and fit capability and

improve the confidence of nuclide identification increasing sensitivity add reducing false positive results. digital hand help but multi-channel Analyser is simple real time isotype used to identification and classification with fully stabilized.

Nai (sodium iodine) probe ( optional) contains gamma locator mode for determination of location of sources for radiation with audible warning and alarm Limit for gamma dose rate with high performance spectroscopy reduced to one bottom simplicity with high-resolution colour LCd that is clearly visible for bright sunlight to night conditions. /refer

Five suspected region, were chosen and Field of suspected radiation where American weapons were stored , in during the year 2003, that suspected areas where explored and examined In-depth to confirm or exclude the existence of Radiation but fortunately radiation was not detected in any region.

to complete the research and to prove the hypothesis ,5 soil and wall construction samplesl were taken for laboratory testing of chemical and radiological analysis of heavy metal , radiation and other environmental pollutants to exclude their appearance.

### 3.Results and Calculations

Table -1- shows the number of affected female in relation to occupation.

The total number affected by the tumor was 14 ; 10 were teachers and 4 were students,. Among 10 teachers 5 were dead, while among the students 2 were dead, and the rest are still alive on treatment.

Table -1-The number of affected female and the death status ;

No and type of affected	No .	Dead	Alive	Total
1]-Teacher	10	5	5	10
2]-students	4	2	2	4
Total	14	7	7	14

Table -2- illustrates the distribution of type of tumors according to affect members among teacher 60% [6 out of 10] had breast cancer ,30% [3 genital ] and 10 % [1] had lung cancer .

Regarding students [ 2 out of 4] 50 % had blood malignancy and 2 had benign solid tumor in the breast .

Table -2- Distribution of type of tumors according to the affected member.

Affected member	Type of tumors		
	Malignant	Benign	Total

	Breast	Genital	Lung	Blood		
Teachers	6	3	1	0	0	10
Students	0	0	0	2	2	4
Total	6	3	1	2	2	14

The result of the radiological analysis using inspector <sup>TM</sup> 1000 multi channel analyzer showed that the level of gamma rays was within the internationally allowed rates i.e . less than 0.057.mrem/hr and the neutron count rate was zero in the 6 suspected sites according to table -3-.

**Table -3-** Levels of gamma and neutron rate in the suspected polluted region.

No	The sites	Gamma dose rate mrem/hr	Neutron count rate Neutron / sec
1	head master dep.	0.0039	0
2	inner ground play	0.0037	0
3	outer ground play	0.0035	0
4	Studying room I	0.0038	0
5	Studying room II	0.0037	0
6	outer ground play	0.0033	0

The results of soil sample testing in the relation to radon level in the three suspected region showed vary small level of radon ,less than the internationally allowed rate ,which was regarded as normal level and environmentally harmless with no any serious effect on human health ,as illustrate in the

table -4-

**Table -4-** The rate of the radon exposure .

Sites	[Mean radon exposure [Bq /m <sup>3</sup>
Behind store	25
Inner play ground	50
Outer play ground	45

As the internationally allowed level is up to 100 Bq /m<sup>3</sup> .

## 4. Conclusion

The exact cause or the intended effect of radiation or chemical was excluded by the two aspect of tests [chemical and radiological],so the causes of carcinoma of breast in the school could not be related directly to the weapons existed at the mentioned area.

In the future all cases with confirmed , breast cancer need to be in depth investigated to show the association of cancer with other socio economic and lifestyle factors.

## 5. Limitation of study

- 1]-the study was done lately as many patients were died during the period of the research.
- 2]- during summer time ,school had holiday and it was difficult to contact the affected patients to complete the study.

## 6. Recommendations

- 1-It is recommended to pay more attention to different risk factors related to development of cancer
- 2- Activation of PEN program in PHCCs for early detection of malignancies in general and ca .breast specifically.
- 3- health promotion for Breast Self –Examinations of all women from age 20 years as affordable screening program.

## 7. Discussion

Kirkuk is an important province of Iraq regarding the industrial activities and oil companies and their burden an environment and pollution.

According to national statistics the number of breast cancer, in 2014 was 244 i.e.23.85 % of total cancer cases , but the registered was 16.17%,in regarding to total population of Kirkuk being 1508854 persons.<sup>[17]</sup>

Ca. breast is one of the multifactorial health problem ;many risk factor has been linked to the conditions genetic being on one extreme the environmental on the other extreme.

Although scientists has determined different factors that contribute to causation of breast cancer , but most experts believe that the disease as mentioned before has combined genetic, environmental and hormonal factors.<sup>[18]</sup>

The appearance of more than 13 cases in same setting (Al-Wasity secondary school) raises the possibility of pollution previously encountered their .

The environmental assessment began by civil defense office in the Kirkuk by the invitation of Kirkuk ,directory of health as the (CBRN ) group has thoroughly investigated the area for chemical remnants of the weapons preserved in the school on as a storage site .<sup>[19]</sup>

The investigation showed nothing relevant to any abnormal biological or chemical substance in the test area . the second step started through the university group of Kirkuk, college of sciences by a scientific committee that consist of three assistant professor in the field of radiation .

The result of the investigation declared that the level of radiation was within level of normal allowed international level.

The site of suspected area in the study was examined using the modern investigator [inspector 1000], that detect the abnormal and harmful radiation, the result showed no any abnormal, risky radiation in the selected region of the school, and the rates were within internationally allowed levels.

In Sulaimaniya province a study done during years 2006 – 2012, that showed increase incidence of breast cancer among women  $\geq 60$  years, but not in younger age.

<sup>[1]</sup>In the current study most of our patients with breast cancer were aged 45 years and above.<sup>[20]</sup>

Regarding the hypothesis of the current study that supposed the association between breast cancer and radiation exposure the a Anex 1 of the recent UNSCEAR expert report on effects of radiation concluded that certain groups of patients are prone to develop cancer if exposed to radiation which includes the first group of patients with tuberculosis who exposed to serial x rays, patients who received radiotherapy for benign disorders, childhood cancer survivors, and women treated for post partum mastitis.<sup>[21]</sup>

In 2016 the crude incidence rate of cancer among female was 26.26% among total cancer cases while in Kirkuk the registered breast cancer cases was 56.01% (219) among all cancer cases (391), being number one among top ten cancer in female.

While in 2015 the total number of breast cancer was 200, and in 2016 it was 219 cases; meaning that the incidence rate is almost fixed with no sharp escalating pattern.<sup>[22]</sup>

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