



## A Relationship between Breast Cancer and the ABO Blood Groups

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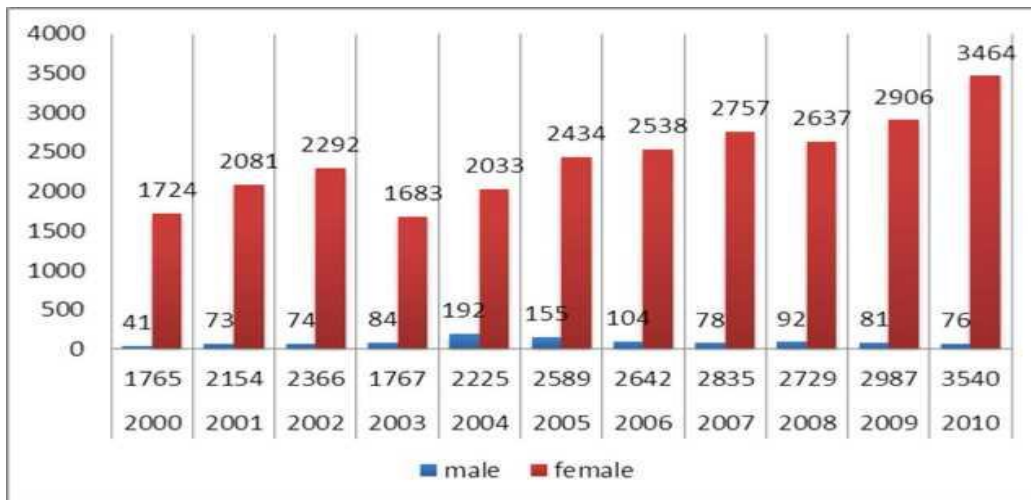
**Abstract :** This work done at the middle Euphrates center cancer, Alnajaf city, Iraq. Also collected samples from Al Sader general hospital al-Najaf al-Ashraf Government, the samples consisted of 72 breast cancer patients with categories of blood category. Overall distribution of categories was comparable between patients (33.3% O<sup>+</sup>, 27.7% B<sup>+</sup>, 22.2% A<sup>+</sup>, 0.5% B<sup>-</sup>, 0.2% A<sup>-</sup>, 0.5% AB<sup>+</sup> and 0.2% AB<sup>-</sup>). We found that patients with O<sup>+</sup> category was positively associated with the risk of breast cancer (adjusted Odds Ratio=22.6, P=0.002). We conclude that O<sup>+</sup> blood type was associated with increased the risk of breast cancer and it might increase the probability to generate hazard for individuals if further studies certain the present preliminary findings.

**Key words:** ABO blood group, breast cancer, ANOVA test.

### Introduction:

Family history of breast cancer, age of menarche, duration of lactation, parity, age of menopause, diet and hormonal levels are known hazard factors for the development of breast cancer<sup>1</sup>. One of the major antigens in humans is the blood group antigens that are present on the surface of red blood cells and different epithelial cells and alteration of these blood group antigens is associated with cancer<sup>2</sup>. An association between the categories of blood and cancer hazard was reported in an old previous study, where blood category A was associated with increased hazard of stomach cancer<sup>3</sup>. Other modern studies have suggested the association between blood categories O and A individuals with increased incidence of duodenal ulcers and gastric carcinoma<sup>4</sup> as well as, the association of B category type and pancreatic cancer, Hodgkin's lymphomas and cardiac cancer<sup>5</sup>. Therefore, blood category antigens on the surface of cancer cells can be used as useful prognostic and diagnostic markers in different types of human cancers<sup>6</sup>. Blood category A is associated with increased hazard of various tumors, including neurologic tumors, salivary gland, colon, uterus, ovary, pancreas, kidney, bladder and cervix<sup>7</sup>. O blood group is also involved in skin cancer and melanoma<sup>8</sup>. Numerous suggests have documented a relation between blood types and breast cancer incidence and prognosis. However other studies have not found any relation between susceptibility to cancer breast. The association between blood group antigen expression and prognostic factors among breast cancer patients has been suggested by previous studies<sup>9</sup>. However, the evidence of an association between blood type and breast cancer is inconsistent as some studies found no association between blood group and breast cancer risk<sup>3</sup>. The following information was obtained for the purpose of the present analysis: age, family history of breast cancer[10]. Over a 11-year period (2000-2010), number of breast cancer in Iraq population was (27599),( 1050)( 3.80%) was male and (26549)( 96.20%)female, In the year 2010 there were 3540 cases of breast cancer in both sexes(3464 female,76male ), While in past years Was less than that as follows in year 2009 there was 2987(2906 female, 81male ),2008 there was 2729(2637 female, 92 male ), 2007 there was 2835 (2757 female,78 male),2006 there was 2642 (2538 female ,104 male, 2005 there was 2589(2434 female, 155 male), 2004 there was 2225(2033

female,192 male ),2003 there was 1767(1683 female ,84 male ), 2002 there was 2366(2292 female,74 male), 2001 there was 2154(2081 female ,73 male ) and 2000 there was 1765 (1724 female ,41 male ) (figure 1)<sup>11</sup>.



**Figure 1: Distribution all cases of breast cancer and sex in Iraq population from 2000-2010.[11]**

Also Found on platelets, epithelium, and cells other than erythrocytes, AB antigens (as with other serotypes) can also cause an adverse immune response to organ transplantation.

	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in Plasma			None	
Antigens in Red Blood Cell	A antigen	B antigen	A and B antigens	None

**Figure2:ABO blood group antigens present on red blood cells<sup>12</sup>.**

Physical activity is any bodily movement produced by skeletal muscles; such movement results in an expenditure of energy. Physical activity is a critical component of energy balance, a term used to describe how weight, diet, and physical activity influence health, including cancer risk<sup>13</sup>.

The relationship between physical activity and breast cancer incidence has been extensively studied, with over 60 studies published in North America, Europe, Asia, and Australia. Most studies indicate that physically active women have a lower risk of developing breast cancer than inactive women; however, the amount of risk reduction achieved through physical activity varies widely (between 20 to 80 percent)<sup>14</sup>. Although most evidence suggests that physical activity reduces breast cancer risk in both premenopausal and postmenopausal women<sup>15</sup>, high levels of moderate and vigorous physical activity during adolescence may be especially protective<sup>16</sup>. Although a lifetime of regular, vigorous activity is thought to be of greatest benefit, women who increase their physical activity after menopause may also experience a reduced risk compared with inactive women<sup>17</sup>. Existing evidence shows a decreasing risk of breast cancer as the frequency and duration of physical activity increase. Researchers have proposed several biological mechanisms to explain the relationship between physical activity and breast cancer development. Physical activity may prevent tumor development by lowering hormone levels, particularly in premenopausal women; lowering levels

of insulin and insulin-like growth factor I (IGF-I), improving the immune response; and assisting with weight maintenance to avoid a high body mass and excess body fat (7)<sup>18</sup>.

**Method:**

The data used in this study were collective from Iraqi breast cancer, located in Najaf governorate. Blood samples were collected from 72 women with breast cancer during their preoperative and after preoperative. Blood was collected into stainless steel injection vein without any additives. Directly after collection, each blood sample was centrifuged at 3000 rpm for 5 minutes in order to separate blood cells and suspended particles from blood serum. Sera were transferred into neutral glass vials and stored in a freezer at (-20 C°) until Dried. Freeze-dryer was used to prepare samples for analysis. The frozen samples were placed into a freeze-dryer at (-40 C°) for 12 hrs. Samples were removed from the freeze-dryer and stored at room temperature in sterilized and dried place<sup>19</sup>.

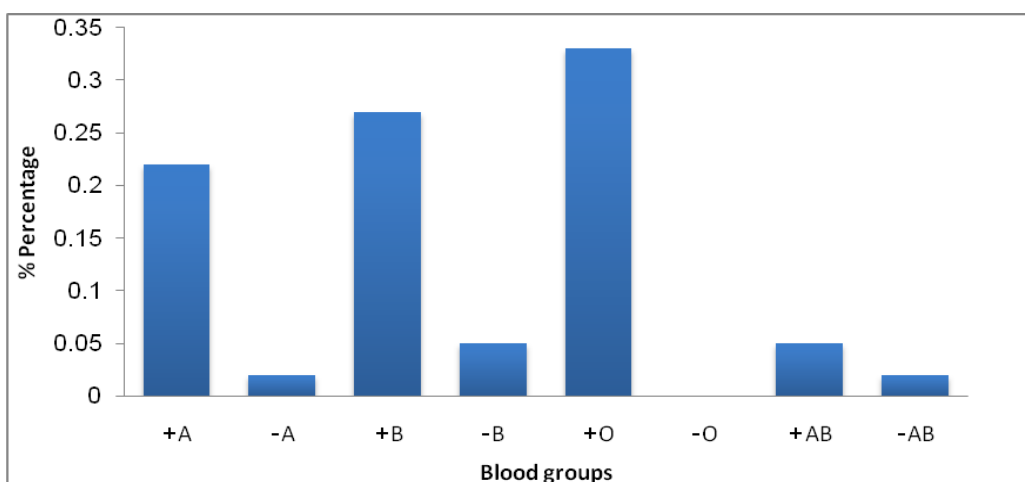
Freeze-drying is a method that offers some advantages over cryopreservation for RBCs. the freeze-drying process removes water (ice) from the frozen cell suspension. The product potentially could be stored at ambient temperature for long periods, omitting the need of refrigeration equipment. Moreover, the decreased weight of the product would favor its unconstrained transportation and availability in an emergency<sup>20</sup>.

**Statistical Analysis:**

Analyzed of Data was performed by SPSS (statistical package for social science) program (SPSS, Inc, Chicago, IL) version 20. Comparisons of characteristic data among the categories blood were achieved using analysis of variance (ANOVA) tests where was significant statically p=0.05.

**Table1: number of categories and percentage of each one.**

Sq.	Blood groups	Numbers of categories	Percentage
1.	O <sup>+</sup>	24	33.3%
2.	B <sup>+</sup>	20	27.7%
3.	A <sup>+</sup>	16	22.2%
4.	AB <sup>+</sup>	4	5.5%
5.	B <sup>-</sup>	4	5.5%
6.	AB <sup>-</sup>	2	2.7%
7.	A <sup>-</sup>	2	2.7%
8.	O <sup>-</sup>	0	0%



**Figure3:comparative among blood groups in females with breast cancer.**

## Results:

The samples studied were 72 female patients with breast cancer, mean aged  $50.7 \pm 11.8$  years, blood categories were found ( $P = 0.05$ ) by ANOVA test among categories. From table (1) and figure (3) we found high frequency of the blood group  $O^+$  (33.3%) followed by  $B^+$  (27.7%),  $A^+$  (22.2%),  $AB^+$  (0.5%),  $B^-$  (0.5%),  $AB^-$  (0.2%),  $A^-$  (0.2%) and  $O^-$  (0%). The frequency of cancer incidence was significantly high in blood group  $O^+$ , while Blood Group  $AB^-$  and  $A^-$  had lower incidence of cancer also the  $O^-$  group did not obtain. Women with blood type  $O^+$  appeared to be significantly associated with breast cancer (odds ratio (OR)=22.6, 95% confidence interval (CI),  $P=0.002$ ).

## Discussion:

In this study, high frequency of blood category  $O^+$  and low frequency of  $AB^-$  and  $A^-$  blood type had been observed in breast cancer patients. This was also agreement previous studies as<sup>21-23</sup>. The association of breast cancer and the blood type had different degrees in various studies. This study showed that the presence of  $O^+$ -Antigen is related to the risk of developing breast cancer<sup>24</sup>. On the other hand, other studies observed no association with ABO blood group<sup>3</sup>. Results achieved from a study performed by Manzarovu et al. reported no relation between the blood groups and breast cancer<sup>25</sup>. While another study reported a positive association between type O and breast cancer risks<sup>31-33</sup>. Other studies observed positive associations with type A or B among women with a family history of breast cancer<sup>16</sup>. Moreover, a study performed by Guleria et al. showed that group  $O^+$  was significantly associated with breast cancer<sup>26</sup>.

## Conclusion:

From our results found the people with blood type  $O^+$  may have a higher hazard of promoting breast cancer than other blood category among patients. Blood groups is an important factor for predicting the cancer risk. However, further expectancy studies are essential to determine the mechanisms by which categories blood type may impact the breast cancer risk.

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