

ABO BLOOD GROUP PHENOTYPES IN PATIENTS WITH BREAST AND CERVICAL CANCERS IN A TERTIARY CARE HOSPITAL IN KADUNA, NORTH WESTERN NIGERIA

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ABSTRACT

Back ground: ABO blood type has been observed in previous studies to be associated with the risk of certain diseases, including pancreatic and gastric cancer.

Aim: The aim of this study was to explore the possible relationships between ABO blood groups and cancer of the breast and cervix and to ascertain if any of the ABO blood groups is associated with the risk of developing breast or cervical cancer

Materials and Methods: This study considered (155) cases of breast cancer and (150) cases of cervical cancer patients, these patients samples were serologically ABO confirmed. A group of (151) apparently healthy females blood donors were also grouped and serve as controls

Result: overall distribution of ABO blood groups were compared between patients with cancer of the breast and cervical cancers, respectively. The results were (26.5% A, 16.8% B, 0% AB and 56.7% O) for breast cancer, and for cancer of the cervix were (38.7% A, 23.3% B, 2% AB, 36% O) and control (25.2% A, 20.5% B, 7.3% AB, 47% O), respectively. Chi-square, at 95% degree of freedom shows that $X^2 = 13.42$ for cancer of the breast with $P < 0.05$ and $X^2 = 15.38$ for cancer of the cervix with $P < 0.05$.

Conclusion and Recommendation: In conclusion, subjects with O blood type were found to be higher in breast cancer, while A blood type were predominate in cervical cancer and suggesting a strong association between cancer of the breast and cervix and ABO blood group. Therefore, subjects with blood types O and A may likely develop breast and cervical cancers.

Key words: Blood Group, Phenotype, Cancer, Association, Serology

INTRODUCTION

Blood group is antigenic expressions which is under genetic control and is found on the red cell surfaces while corresponding antibodies exist in the immunological fraction of the plasma or serum (Lola *et al.*, 2011). Cancer or neoplasia is a term which covers malignant new growth in any part of the body that is uncoordinated with the normal control mechanism of the body due to its nonstop, even when the stimulus that causes it has stopped and subsequently flourish at the expense of human host (Lynne, 2019). It is characterized by its

tendency to cause local destruction, invade adjacent tissue and spread by metastasis (Jiang *et al.*, 2015). It frequently occurs after removal and this growth is purposeless. Example of cancer includes cancer of the breast, cervix etc. Cancer of the breast and cervix are the most common malignancy that affects women in many parts of the world (Silvana *et al.*, 2013). Relationship between blood group and disease can be said to be direct since blood group antibodies can be shown to be causative agent in some diseases e.g. haemolytic disease of the newborn (Giancarlo and Massimo, 2013).

Tursen *et al.* (2005) reported association between carcinoma of the skin and blood group O. Giancarlo and Massimo, (2013) reported that blood group A has a significant relationship with cancer of the breast and also cancer of the female reproductive organ which tends to show strong association with group A and slightly with B. It has long been known that Africans are mostly of the Duffy blood type Fy (a⁻b⁺) and are also mostly highly resistant to the malaria parasite *P. Vivax* (Gledson and Glauber, 2011). Christopher *et al.* (2011) reported that *P. vivax* would either enter into human red cells of Duff type Fy^a or Fy^b but not cells of the type Fy (a⁻b⁺), hence the non-existence of *P. vivax* infestation in tropical Africa. It is estimated that one in eight Caucasian women (one in 14 blacks) in the USA (double in the risk in 1940) and one in twelve in Britain developed cancer of the breast and cervix in their life time and the incidence was rising. In USA, about 175,000 new cases are diagnosed and about 46,000 die of it every year (Bado and Archamepong, 1994). In Africa the true incidence of cancer is not known, but the disease is being seen more often than before (Elima *et al.*, 2012), and its frequency increase to about 6.0% with change in life style, increasing standard of living and the rising life expectancy in Africa (Rebecca *et al.*, 2015). Cancer of the breast and cervix is likely to become major problem in the future. Genetic, hormonal, social and other factors including racial and dietary have been highlighted as aetiological and risk factors of cancer (Galukande *et al.*, 2016). Due to the fatal consequence caused by cancer to the people and since the whole of human race fall into the ABO grouping system (Rebecca *et al.*, 2015), This work is aimed at studying the ABO blood groups of patients with cancer of the breast and cervix with view of relating it genetic implications.

MATERIALS AND METHODS

A total of 155 cases of histologically confirmed breast and 150 cervical cancer cases were tested for ABO blood groups at Ahmadu Bello University Teaching Hospital Shika, Zaria, Kaduna, randomly. They were

selected from department of pathology files, and patients traced to oncology department and samples were collected, they were grouped at the Blood Bank of Department of Haematology ABU Teaching Hospital Shika, while 151 normal blood donors were grouped to serve as control. Cancer of the breast and cervix cases were classified to their A, B, AB and O group after carrying out the blood grouping using cell grouping tile method and cell/serum grouping standard tube methods. Control samples were treated as test samples. Data was analysed using SPSS version 16.0 statistical software. The percentage was computed and results were expressed as percentages. Chi-square, analysis was done on null hypothesis of no association based at 95% confidence level.

RESULTS

The results obtained from the present study are presented in tables 1 and 2, respectively. Table 1 shows the ABO blood group distributions in breast and cervical cancers of patients and Controls. In Breast Cancer, blood group O has the highest frequency of 88 (56.7%), while the lowest frequency of 0 (0%) was observed in blood group AB. In cervical Cancer, blood group A has the highest frequency of 58 (38.7%), while the blood group AB had the lowest frequency 3 (2%). The percentage distribution of ABO blood group in Breast cancer and cervical cancer patients and controls was shown in table 2. The higher percentage distribution was observed in blood group O 56.7%, while the lower percentage distribution in blood group AB 0% in Breast cancer. In Cervical cancer, blood group A 38.7% had the highest percentage distribution; while Blood group AB 2% had the lowest percentage distribution. Using the null hypothesis (H₀) of no association between breast and cervical cancer and ABO Blood group at 95% degree of freedom $\chi^2 = 13.42$ for cancer of the breast with $P < 0.05$ and $\chi^2 = 15.38$ for cancer of the cervix with $P < 0.05$, which goes against the null hypothesis.

Table1: ABO Blood group distribution in breast and cervical cancer in patients and Controls.

Blood group	A	B	AB	O	Total
Cases of breast cancer	41	26	0	88	155
Cases of cervical cancer	58	35	3	54	150
Control	38	31	11	71	151

Table2:Percentage distribution of ABO Blood group in Breast cancer and Cervix cancer in patients and controls.

Blood group	A	B	AB	O	Total
Cases of breast cancer	26.5%	16.8%	0%	56.7%	100
Cases of cervical cancer	38.7%	23.3%	2%	36.0%	100
Control	25.2%	20.5%	7.3%	47%	100%

$Ca\ bra=X^2=13.42, p=<0.05$ $Ca\ Cx=X^2=15.38, p=<0.05$

Key: %=percentage; *Ca bra*=Cancer of breast; *Ca Cervix*

DISCUSSION

The menace of cancer has been a global health disturbance, due to its high rate of mortality and morbidity (WHO, 2013). Nigeria having the largest population in sub-Saharan Africa with rapidly growing number of people with cancer and survival is far less likely than is in the case of high-income countries (Azubuike *et al.*, 2018). Owing to the fact that, the role of genetic factors in the development of malignancy is widely accepted (Flavarjani *et al.*, 2014).

In the present study, the blood group with the highest frequency for breast cancer was group O, this is in agreement with the report of Flavarjani *et al.* (2014) among Isfahanian. However, differs with the report by Meo *et al.* (2017), where they reported blood group “A” has high incidence of breast cancer in Saudi Arabia. This may be due to the geographical distribution of blood groups. Where in Nigeria, the higher distribution of blood group is O (Mwangi, 1999; Anifowoshe *et al.*, 2017).

The current study shows that, the blood group with the lowest frequency for breast cancer was group AB; this is in conformity with the report of Meo *et al.* (2017). This can be attributed with the lower distribution of blood group AB among the studied population.

Current study reveals that, blood group with the highest frequency for cervical cancer

was group A, this is in agreement with the report of Mansour *et al.* (2014). Yuzhalin and Kutikhin (2012) reported contrary in South-East Siberia with AB having the highest incidence. An explanation to this may be due to non-O blood group is an independent risk factor for the progression of cervical cancer and its associated risk factors and may be suggestive that the effect of blood type A on cervical cancer development was capable of being masked by the effect of cervical cancer susceptibility genes and/or that the inherited or non-inherited types involve different etiologic mechanisms (Mansour *et al.*, 2014). In this finding, blood group with the lowest frequency for cervical cancer was group AB, this is in consistence with the report of Seth and Rachel, (2016). Hsiao *et al.* (2015), report contrary, and this discordance may be attributed to the low distribution of AB Blood grouping in our community.

The current study shows that, there was association between cancer of the breast and cervix and ABO blood group. This is in conformity with the reports of Seth and Rachel, (2016). But disagreed with the report of Dede *et al.*, (2010). The disparity in our finding with previous finding may be due to the used of hospital-based controls.

CONCLUSION

Results of our study suggest, Blood group “O” has high incidence of breast cancer and Blood group “A” has high incidence of cervical cancer with blood group “AB” having minimum occurrence of both cases. Further large scale multicentre and longitudinal studies may be required to throw more light on blood group type and cancer diseases.

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Conflict of Interests

The authors declared that there is no conflict of interests regarding the publication of this paper.

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