DETECTION OF CLINICALLY SIGNIFICANT RH BLOOD GROUP AMONG BREAST CANCER PATIENTS AND ETHNICITIES IN NORTH EAST OF NIGERIA

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ABSTRACT

Rhesus blood system is one of the clinically significant blood group . Of these Rh antigens, Rh D, C, E, c and e are the most clinically significant which can cause serious hemolytic transfusion reaction. The study was done to detect blood group (D, C, E, c and e) and its relationship between breast cancer patients among different ethnicities in north east of Nigeria. 5mls sample of blood were collected each from 432 subjects and phenotype for Rh D, C, E, c and e using Lorne Laboratories of UK Anti-D, anti-C, Anti-E, Anti-c and Anti- e reagent. Out of 432 subjects tested, Rh e antigens had the highest frequency with 97.2% positive. The least detected among the phenotype antigens in the subject was Rh E antigen with 23.6%. Among the subjects phenotype, Hausa/Fulani has the highest number of breast cancer patients with 62.5% while Igbo has the least number with 6.9%.The distribution of Rh antigens among different showed that there is no statistical significant difference except Rh C with P- value of 0.032. Thus, Rh C is the only phenotype Rhesus antigen that has a statistical significant with different tribes and ethnicities. We conclude from this study that the Rh distribution among female breast cancer patients in north east of Nigeria follow the detection of the Rhesus antigen seen among other populations.

KEYWORDS

Rhesus antigens, Breast cancer, Prevalence & Blood Group

1. INTRODUCTION

Breast cancer is the commonest malignancy occurring in women worldwide with up to one million cases seen annually [1, 2]. The incidence varies widely with rates highest in North America and Western Europe and low in Japan, China and black Africa [1, 3].

Breast cancer is the most common cancer occurring among women in Nigeria having overtaken cancer of the cervix [4]. It is also the commonest cancer among women in South Africa [5]. While incidence seems to have stabilized and even declined in most developed countries, it has been increasing in hitherto low incidence areas of Asia and black Africa [6, 7, and 8].

Some cancer cells acquire the ability to penetrate the walls of lymphatic and/or blood vessels, after which they are able to circulate through the bloodstream (circulating tumor cells) to other sites and tissues in the body. This process is known (respectively) as lymphatic or hematogenous spread. After the tumor cells come to rest at another site, they re-penetrate the vessel or walls and continue to multiply, eventually forming another clinically detectable tumor. This new tumor is known as a metastatic (or secondary) tumor. Metastasis is one of the "Hallmarks of Cancer", distinguishing it from benign Tumors [11]. Most neoplasm can metastasize, although in varying degrees (e.g., basal cell carcinomas rarely metastasize) [11].

Carcinoma - these tumors are derived from the skin or tissues that line body organs (epithelial cells). Carcinomas can be, for example, of the stomach, prostate, pancreas, lung, liver, colon or breast. Many of the most common tumors are of this type, especially among older patients [12]
Cancer stem cells may play a major role in tumor growth, three studies published in the journals Nature and Science revealed in August 2012. Scientists believe cancer might have its own stem cells that impact on the re-growth of tumors. They added that if further studies confirm their findings, the way we treat cancerous tumors may change dramatically [23].

Malignant tumor - Cancers are a large family of diseases that involve abnormal cell growth with the potential to invade or spread to other parts of the body [12]. They form a subset of neoplasm. A neoplasm or tumor is a group of cells that have undergone unregulated growth and will often form a mass or lump, but may be distributed diffusely [13].

Metastasis - is the spread of a cancer or other disease from one organ or part of the body to another without being directly connected with it. The new occurrences of disease thus generated are referred to as metastases (mets) [14]. Cancer occurs after a single cell in a tissue is progressively genetically damaged to produce cells with uncontrolled proliferation. This uncontrolled proliferation by mitosis produces a primary heterogenic tumour. The cells which constitute the tumor eventually undergo metaplasia, followed by dysplasia then anaplasia, resulting in a malignant phenotype. This malignancy allows for invasion into the circulation, followed by invasion to a second site for tumorigenesis, [15].

The incidence rate of breast cancer among West African women is quite low compared to that of African-Americans and Whites but it has gradually risen in recent times such that the incidence in premenopausal age group is now higher than those of whites [8]. Earlier incidence rates were between 13.8 and 15.3 per 100,000, but it has now risen to 33.6 per 100,000 [8]. The reason for this rise may be due to “westernization” of dietary lifestyle, increase in the average life expectancy, use of hormone replacement therapy (HRT) in the urban areas, and better reporting of the disease [9]. The decrease in incidence rates of breast cancer in the USA and Great Britain among women aged between 50 and 64 years on the other hand are linked to decrease use of HRT [10].

The term (Rh) Rhesus refers not to a specific red cell antigen but also to complex blood group system that is currently comprised of more than 50 different antigenic specificities. Rh blood system is one of the most important blood group systems after ABO [2]. Also, it has been affirmed that Rh blood group system is one of the most polymorphic and immunogenic systems known in humans [4]. In the past decade, intense investigation has yielded considerable knowledge of the molecular background of this system. Clinically, there are five (5) known Rh

antigen, which are D, C, E, c and e [12]. The genes encoding 2 distinct Rh proteins that carry C or c together with either E or e antigens, or the D antigen, have been cloned and the molecular bases of many of the antigens and of the phenotypes have been determined. A related protein, the Rh glycoprotein is essential for assembly of the Rh protein complex in the erythrocyte membrane and for expression of Rh antigens [4].

Cancer/tumors are associated with anemia which needs to be corrected by blood transfusion [16]. The management of cancer patients by chemotherapy requires more than one blood transfusion (multiple blood transfusions) in order to boast red cells and platelet count. Blood transfusion can lead to the development of alloantibodies. The development of clinically significant red cells alloantibodies complicate transfusion therapy and pregnancy outcome. Alloimmunization to clinically significant red cell antigens are the major complications observed among pregnant women and multiple- transfused patients (e.g. cancer patients) making it difficult to source compatible units for transfusion [16].

Red cell immunization during pregnancy and transfusion remains a major challenge to obstetrician, the managing clinician and transfusion practitioners. The paucity of data on the epidemiology of blood group antigens other than ABO (Rh antigens) and alloimmunization of red cell clinically significant antigens among these patients; the role of alloantibodies in case of HTR and HDFN in this population is also unknown and the phenotyping of donor units for clinically significant red cell antigens is not done routinely.

2. MATERIAL AND METHODS

2.1. Study Design

This is a descriptive study to determine the presence of clinically significant RH blood group phenotypes and its relation with breast cancer patients in north east, Nigeria**.**

2.2. Ethical Clearance

Ethical approval for this study was obtained from Ethical Committee from each ministry of health of the 6 states in north eastern part of Nigria

2.3. Sample Size Determination

The sample size was determined according to (Kish & Leslie 1965) using the formula:

$n = Z^2 p\,(1-p)/d^2$

Where:

n	=	minimum sample size
z	=	standard normal deviation and probability.
p	=	prevalence or proportion of value to be estimated from previous studies.
q	=	Proportion of failure (= 1 - P)
d	=	precision, tolerance limit, the minimum is 0.05.

Therefore $n = z^2\,pq/d^2$

Where Z = 95% (1.96)

P = 10.4% (0.104) [21]. work on prevalence of breast cancer among women in Northwest Nigeria, 2012.
q = 1 - 0.104 (=0.896)
d = 5% (0.05)

Therefore $n = (1.96)^2(0.104)(0.896) / (0.05)^2$
$n = 143$

However, the total number of breast cancer patients registered in most of the hospitals in the state for the year 2022 was 100 (Health record office, states hospitals 2022).Thus, the sample size was adjusted for finite population using the formula for the calculation of finite population where;

$N_f = n/(1+n/N)$
n = calculated sample size
N = number of breast cancer patients
$n_f = 143/(1+143/100)$
$n_f = 143/(1+143/100)$
$n_f = 143/(2.43)$
$n_f = 58.84$ approximately 59

Adding 10% attrition rate to the calculated sample size,

$10/100 \times 59 = 5.9$

59+5.9 = 64.9 approximately 65

Therefore, the calculated sample size was 65 and multiply by six states in the north east.

2.4. Study Population

The population for this study comprised of histological confirmed 432 breast cancer patients. All the subjects were recruited from Department of surgery, oncology and pathology of hospital in the north eastern states, Nigeria.

2.5. Sampling Method

Consecutive method was applied in recruiting all the eligible subjects for this research work.

2.6. Sample Collection

Five milliliters (5mls) of whole blood was collected each via venepunture using BD vacutainer system 3ml of blood was transferred into K_3 EDTA anticoagulated tube and the remaining 2ml was transferred into blood culture bottle under strict aseptic techniques. The EDTA anticoagulated sample was used for RH profile determination and the blood in culture bottle use for the detection of bacterial in blood.

2.7. Methods of Analysis

Haematological analysis

The following techniques were used for the analysis of Rh profile parameters. For the Rh C, E, c and e profile, tube method was employed to determine the various RH blood groups of the samples while tile method was used to determine the status of Rh D antigens.

Principle of the test

Lorne monoclonal IgM anti Rh blood grouping Technique (2012)

The principle of the test was based on the Hemagglutination where the red cells possessing the specific antigen agglutinates corresponding reagent (antibody).

Procedure of the test

Tube method

Red blood were phenotyped for D, C, E, c and e antigens according to standard serological test with IgM Monoclonal antibody specific for the aforementioned antigens, then two test tubes were arranged in a row and labeled anti – e and control for each of the 72 subjects each from states. These were repeated for all the remaining antigens i.e C, E, and c antigens. Two drops of antisera and one drop of 5% washed RBC suspension were added to each tube then followed by incubation at 37^0c for 30 minutes. At the end of the 30 minutes, the tubes were centrifuge at 1000rpm for one minute and agglutination was read macroscopically. Confirmation of the test was done using microscope at ×10 objective lens with the condenser sufficiently closed.

Tile method

Tile method was employed in testing for Rh D antigens. Where a drop of 5% washed red cell suspension was placed on a clean, sterile and dirty free tile, and two drop of anti- D was placed on the same spot, and the spot was mixed gently and rocked for five minutes. After five minutes, agglutination was observed both macroscopically and microscopically, thus the results were recorded.

Study Subjects/Selection

Inclusion criteria

- All female patients that were histologically confirmed to have breast cancer each state hospitals.

2.8. Exclusion Criteria

The following patients were excluded from participating as subjects in this study.

- Patients with breast lesions not confirmed histologically and those with histologically confirmed non-neoplastic lesions were excluded from the study.
- All male patients with breast cancer were excluded.
- Patients who refused to give their consent for participation were excluded the study.

2.9. Statistical Analysis

Data collected was recorded on an excel spreadsheet and later subjected to statistical analysis using a statistical software SPSS version 20 on a computer to define the nature of the distribution of data for each group. Statistical analysis included descriptive statistics of frequency, percentage and chi- square. Pearson's correlation method was used to determine the relationship between different sets of data. Probability (i.e. $P<0.05$) was used to determine the level of significant for all statistical analysis.

2.10. Study Instrument

Questionnaire

A semi structured interviewer questionnaires were administered to all consenting participants to obtain information on patients' bio-data and socio-demographic.

Informed Consent

Written informed consent was obtained from all the eligible participants in respect to their approval.

3. RESULTS

Seventy two (72) blood samples were collected each from histologically confirmed breast cancer patients attending hospital in the 6 staes and phenotyped for Rh D, C, E, c and e antigens. The results show that, Rh D was 390 (90.3%), Rh E was 102 (23.6%), Rh C was 150 (34.7%), Rh c was 312 (72.7%) and Rh e was 420 (97.2%). The most frequently occurring Rh antigens among the principal Rh antigens phenotyped are Rh e > D > c.

Table 1 shows the socio-demographic characteristics of the subjects. The age range of 40 - 49 years was found to have the highest frequency 198 (45.8%), followed by 30 - 39 years 150 (34.7%), 50 - 59 years 54 (12.5%), 20-29 years 18 (4.2%) while 60-69 and 70-79 years have 6 patient with 1.4% each. Occupational distribution showed that those who are unemployed/ full housewife have the highest 306 (70.8), while the employed ones have 126 (29.2%). Ethnic distribution indicated that Hausa/Fulani had the highest frequency 270 (62.5%), followed Yoruba 66 (15.3%), others 66 (15.3%) and Igbo 30 (6.9%). The marital status of the patients shows that married women have the highest frequency 45 (80.6%), followed by widow 42 (9.7%), single 36 (8.3%) and divorced women 6 (1.4%). Intermarriage has the highest frequency 420 (97.2%) while consanguineous has 12 (2.8%). In cancer stages among the patients, stage 18has the highest frequency 204(47.2%), followed by stage two 144 (33.3%), stage four 72(16.7%) and lastly by stage one 12 (2.8%).

Table 1: Socio-demographic Factors Among Breast Cancer Patients

Variables	Frequency	Percentage (%)
Occupation		
Employed	**126**	**29.2**
Unemployed/housewife	**306**	**70.8**
Tribes		
Hausa/ Fulani	**270**	**62.5**
Yoruba	**66**	**15.3**
Igbo	**30**	**6.9**
Others	**66**	**15.3**
Marital Status		
Married	**312**	**80.6**
Single	**36**	**8.3**
Divorced	**6**	**1.4**
Widowed	**42**	**9.7**
Age Group		
20-29	**18**	**4.2**
30-39	**150**	**34.7**
40-49	**198**	**45.8**
50-59	**54**	**12.5**
60-69	**6**	**1.4**
70-79	**6**	**1.4**
TYPESOF MARRIAGE		
Intermarriage	**420**	**97.2**
Consanguineous	**12**	**2.8**
Cancer Stages		
Stage 1	**12**	**2.8**
Stage 2	**144**	**33.3**
Stage 3	**204**	**47.2**
Stage 4	**72**	**16.2**

The socio-demographic factors shows highest detection among Hausa/Fulani with 270(62.5%) followed by Yoruba and Other tribes with 66 (15.3%) while Igbo has the least number of 30 patients (6.9%).

Table 2 showed the detection of Rh D, C, E, c and e antigens phenotyped for breast cancer patients. Rhesus e and D have the highest frequency of 70(97.2%) and 65(90.3%) respectively. The least among was Rh E 17(23.6%) while Rh c and C are 52(72.2%) and 25(34.7%) respectively.

Table 2: Detection of Clinically Significant Rhesus Antigens among the Subject Phenotyped

Rhesus	Frequency	Percentage
Rh D^{Neg}	390	90.3
Rh C^{Pos}	42	9.7
Rh D^{Pos}	150	34.7
Rh C^{Neg}	282	65.3
Rh E^{Pos}	102	23.6
Rh E^{Neg}	330	76.4
Rh c^{Pos}	312	70.2
Rh c^{Neg}	420	29.8
Rh e^{Pos}	120	97.2
Rh e^{Neg}	12	2.8

The detection Rh D was (90.3%) positive while 9.7% was negative. Rh C positive and negative was 34.7% 65.3% respectively. Rh E positive was 23.6% while 76.4% was negative. The prevalence of Rh c and e positive and negative were (70.2% and 29.8%) and (97.2% and 2.8%) respectively.

Table 3 shows the variation in distribution of clinically significant Rh antigens among the breast cancer patients attending specialist hospital, Sokoto based on their ethnicity. The results show that, Hausa/ Fulani have the highest number across all the phenotyped rhesus antigens with frequency 45 (62.5%), followed Yoruba 11 (15.3%), others was 11 (15.3%) and Igbo 5 (6.9%). The table shows the relationship between each Rh antigen and ethnicity.

Table 3: Detection of Clinically Significant Rhesus Antigens among the Different Ethnic Groups.

Ethnicity	RhD		RhC		RhE		Rhc		Rhe	
	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG
HAUSA	246	24	72	198	72	198	198	72	264	6
YORUBA	66	0	24	42	12	54	48	18	60	6
IGBO	24	6	6	72	6	24	18	12	30	0
OTHERS	54	12	54	18	12	54	46	18	66	0
TOTAL	390	42	150	282	102	330	312	120	420	12
X^2-VALUE	**2.719**		**8.984**		**0.629**		**0.403**		**2.132**	
DF	3		3		3		3		3	
P- VALUE	**0.437**		**0.032**		**0.890**		**0.940**		**0.545**	

The P-value for Rh D, c, E, and e were 0.437, 0.940, 0.890 and 0.545 thus, they are statistically not significant while only Rh C with 0.032 which is statistically significant.

Table 4: Detection of Clinically Significant Rhesus Antigens among the Different Ethnic Groups.

Ethnicity	RhD		RhC		RhE		Rhc		Rhe	
	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG
HAUSA	246	24	72	198	72	198	198	72	264	6
YORUBA	66	0	24	42	12	54	48	18	60	6
IGBO	24	6	6	72	6	24	18	12	30	0
OTHERS	54	12	54	18	12	54	46	18	66	0
TOTAL	390	42	150	282	102	330	312	120	420	12
X^2-VALUE	2.719		8.984		0.629		0.403		2.132	
DF	3		3		3		3		3	
P- VALUE	0.437		0.032		0.890		0.940		0.545	

The P-value for Rh D, c, E, and e were 0.437, 0.940, 0.890 and 0.545 thus, they are statistically not significant while only Rh C with 0.032 which is statistically significant.

Table 5: Comparison of detection of Rhesus Antigens with other studies.

	RH D%	RH C%	RH E%	RH c%	RH e%
PRESENT STUDY	90.3	34.7	23.6	70.2	97.2
CAUCASIANS	85	68	28	80	98
BLACK RACE	92	27	22	96	98
CHINESE	99	93	39	47	96
SHARMA *et al.*	91.6	84	25.6	58.3	78.5
MAKROO *et al.*	93.6	87	20	58	98
KAHAR *et al.*	84.34	81.74	21.74	56.52	100

Detection of Rhesus antigens across the world shows that the values obtained from this present study are in line with the values of the black race.

4. DISCUSSION

The knowledge of various blood group antigens and phenotype frequencies in a population is important in day to day work in a transfusion service in areas such as antenatal serology, paternity testing, and selecting compatible blood in problematic transfusions. There are many problem associated with cross-matching and selection of safe and adequate blood for cancer patients, most especially breast cancer patients (been the most common cancer among the females). In most cancer. In women with breast cancer, however, this dogma may not apply however, they likely more pathogens than contaminations. A lot of information has been published on prevalence of ABO blood groups among different ethnicities across the world but there is little information about the prevalence of Rh antigens among breast cancer patients across the world. Therefore, the study was carried out to know the prevalence of Rh antigens among breast cancer patients in north-east of Nigeria.

This research work focused on seventy two (72) breast cancer patients in each state hospital. The patients were phenotyped for the prevalence of principal Rhesus antigens (D, C, E, c and e) and the results was showed in table 1. From the aforementioned table, Rh e antigens have the highest frequency of 420 (97.2%), while only twelve (12) patients were phenotyped to be Rh e negative with 2.8%. This detected number was almost the same with the prevalence of Rh e antigen phenotyped among pregnant women attending antenatal clinic in Usmanu Danfodiyo University teaching hospital, Sokoto by Erhabor *et al.*, 2016 in which Rh e positive was 98.5% while Rh e negative was 1.5%.There was a different of 1.3% Irina *et al.*, 2014 work and this present work for

both Rh e positivity and negativity. This shows that the prevalence of Rh e antigens between the pregnant women in north east and that of breast cancer patients differs. Even though the difference is not that much, there is need to take into consideration the low number of Patients with Rh e negative and the need to sort blood of corresponding antigens for such patients. The detected numbers of Rh e antigens among the blood donors in Kano by Baffa and Shehu, 2016 shows that 96.1% of donors were Rh e positive while 3.9% were negative. In another publication by Irina *et al*. (2014) in Georgia, USA, Rh e antigen was 97.69%, while 2.3% were Rh e negative. The result obtained from prevalence of Rh e antigen among blood donors in India by Deepthi *et al.,* 2016 shows that Rh e antigens has 98.4% while Rh e negative was 1.6%. The similarity between all this facts is that there is high detection of Rh e positive across the world while there is scarcity of Rh e negative thus the need to intensify the search for Rh e negative blood so as to provide safe and adequate blood for few patients that may be in need of it. Rh D antigen is the second most common Rh antigen among breast cancer patients. We observed the prevalence of Rhesus (D) positive and negative prevalence of 390 (90.3%) and 42(9.7%) respectively among the breast cancer patients, in north east. This finding is almost consistent with previous reports obtained among non- Caucasians by Erhabor and colleagues in the Niger Delta of Nigeria and in Gusau, North Western Nigeria (93% and 7%) and (98.8% and 1.2%) respectively. In the same vein, the prevalence of Rh D antigens among pregnant women in Sokoto by Erhabor *et al.,* 2014 shows that 92.9% and 7.1% were Rh D positive and negative respectively. The finding from Kano by Baffa and Shehu, (2016) shows that the prevalence of Rh D among blood donors was 97.1% and 2.9% positive and negative respectively. This shows that the prevalence of Rh D negative among the breast cancer patients is higher compared to the result obtained from previous research. Thus, there is need to increase the search for more Rh D negative considering its immunogenicity and its ability to cause hemolysis in transfusion reaction. The detection of Rh c antigen is the third most common Rh antigens phenotyped among breast cancer patients in north east of Nigeria. The result shows that Rh c positive and negative were 312 (72.2%) and 120(27.8%) respectively. There is decrease in percentage of Rh c positivity and increase in percentage of negativity when compared with the prevalence of Rh c antigens among pregnant women in Sokoto by Erhabor *et al.,* (2014) in which the Rh c positive and negative were 92% and 8% respectively. The detection of Rh c antigens among the blood donors in Kano by Baffa and Shehu, 2016 shows that 85.4% of donors were Rh c positive while 14.6% were negative. This shows that there is need to intensify the search for Rh c negative blood for breast cancer patients since the detection is higher in them compared to other previous studies. The detection of Rh C among breast cancer patients were 25 (43.7%) and 47(56.3%) positive and negative respectively. This happens to be the first Rh antigens in which the percentage of Rh negative will be more than that of Rh positive. This result was in line with the prevalence of Rh C antigens among blood donors in Sokoto by Erhabor *et al*. (2014) and in Kano by Baffa and Shehu, (2016) in which the Rh C positive and negative were (25.8% and 74.2%) and (28.2% and 71.8%) respectively. The number of patients phenotyped to be Rh C negative was lesser in this present study compared to the previous studies but the common fact between them is that, Rh C negative is higher across all the studies. This shows that of Rh C positive antigen in breast cancer patients is higher than those of the pregnant women in north east, Nigeria.

Rh E antigen has the least prevalence among all the Rh antigens phenotyped in this study with 17 (23.6%) positive while 55 (76.4%) were negative. The result obtained was almost in line with the work of Baffa and Shehu, 2016 in which the detection of Rh E antigens among the blood donors in Kano was 34% positive while 66% were Rh negative. The result also agreed with the work of Jeremiah *et al.,* 2012 in delta state Nigeria in which the detected Rh E positive and negative antigens among antenatal women was 20.1% and 79.9% respectively. Also, the detection of Rh E antigens among breast cancer patients was 23.07% positive while 73.93% were Rh E negative. This indicates that, the prevalence of Rh E negative is much higher than that of positive. Thus,

the little differences among all the principal antigens phenotyped could be due to different in genetic makeup of the patients.

Socio-demographic factors of the patients' were showed in table 4.1.The occupation status of the patients showed that 126 (29.2%) of them were gainfully employed while 306 (70.8%) were unemployed/Full housewife. This result justifies the fact that, most northerners, most especially here in Sokoto (The Seat of Caliphate) where Islamic religion is widely accepted and practice. The distribution of the subjects based on tribes and ethnicity showed that majority of the subjects were Hausa/ Fulani 270 (62.5%) followed by Yoruba and Other tribes 66 (15.3%) each, while Igbo has the least figure 30 (6.9%). This result supports the fact that, the site where the research was conducted was mainly Hausa/Fulani occupant. Also, majority of these subjects were married 312 (80.6%) while single among them were 36 (8.3%), widowed were 42 (9.7%) and a divorced 1(1.4%). The highest number of breast cancer patients phenotyped for Rh antigens falls within the age range of 40-49 with 198 (45.8%) followed by 30-39 with 150 (34.7%). 20-29 has 18(4.2%) while the least were 60-69 and 70-79 with six patient each (1.4%) respectively. Most of the subject phenotyped indulged in intermarriage 420 (97.2%) while consanguineous marriage account for only 12 (2.8%).

The distribution of Rh antigens among different ethnicities was showed in table 4.3. The result shows that, Hausa/Fulani has the highest number of subjects 270 (62.5%) Followed by Yoruba with 11 (15.3%), others 66 (15.3%) and Igbo 30 (6.9%). The p-value of Rh D antigen for all the tribes is 0.437. This means there is no statistical significant between the Rh D antigen and the tribe since the P- value of statistically significant used for this work is ($P<0.05$). The P- value obtained for Rh C antigen was 0.032. This means the relationship between Rh C and different ethnicities is statistically significant considering the P-value for this work ($P<0.05$). The P- value for Rh E antigen in this work is 0.890 while that of Rh c and e were 0.940 and 0.545 respectively. From the P- value used for this work, it can be concluded that there is no statistically significant between Rh E, c and e and different ethnicities phenotyped for Rh antigens.

5. CONCLUSION

From the result obtained in this research work, it can be concluded that: Rh e antigens have the highest prevalence among the breast cancer patients attending Specialist hospital, Sokoto with 97.2% followed by Rh D with 90.3%. Rh c recorded72.2% while Rh C and E were 43.7% and 23.6% respectively. The presence of these antigens among these population make the incorporation of their testing in addition to Rh D antigen as routine blood grouping prior to transfusion necessary in order to minimize or prevent the clinical sequelae transfusion reactions and also, minimize the challenges been faced in selecting safe and adequate blood supply for multi transfused patients . Additionally, the low detection of the Rh E positivity in these patients make it imperative to implement the multifaceted approach proposed as the solution to the problem of Rh E positive donor blood scarcity in the state.

6. RECOMMENDATION

Based on the results generated and journals consulted about this research work, the following recommendations are given:

1. There should be inclusion of phenotyping of principal Rh antigens (e.g D, C, E, c and e) in routine test for all the breast cancer patients at a point of blood screening so as to prevent alloimmunization in such patients.

2. All cancer patients should be phenotyped for all clinically significant antibodies so as to make provision of safe and adequate blood supply for them at a point of urgent need.

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