International Journal of Healthcare Sciences ISSN 2348-5728 (Online)
Vol. 2, Issue 2, pp: (126-129), Month: October 2014 - March 2015, Available at: www.researchpublish.com

Frequencies of ABO Blood Groups among Blood Donors in Ado-Ekiti and Its Metropolis, South-West, Nigeria

[1]Peter Ojo Famoni, [2]Tolulope Adekoya-Benson, [3]Olugbenga Ajala, [4]Adegboyega Agbaje, [5]Omobolanle Olatimehin, [6]Olusegun Christopher Adeosun, [7] Haleem Olujuwon Ibraheem, [8]Thompson Joseph Akinbolaji

Hematology and Blood Transfusion Department, Ekiti State University Teaching Hospital, Ado-Ekiti, Ekiti State, Nigeria.

Abstract: **When red blood cells carrying one or both ABO antigens are exposed to the corresponding antibodies, they agglutinate (clump together). People usually have antibodies against those red cell antigens that they lack. This research work is therefore embarked upon to know the frequency of ABO blood groups among blood donors in Ado-Ekiti and its metropolis. 7242 subjects who visited the Blood Bank of Ekiti State University Teaching Hospital, Ado-Ekiti between January 2009 and October 2014, to donate blood either as relative donors, voluntary donors or commercial donors were recruited for this study. 4ml of blood was collected into plain bottles from each Subject. Cells and sera grouping were subsequently carried out after clot retraction. Blood Group O has the highest frequency (73.04%) followed by group A (13.42%) and then group B (13.12%) while group AB has the least frequency (0.41%). The highest frequency of blood group O is due to the ability of group O individuals to donate to other blod groups other than group O and also the fact that group O is the commonest blood group. Male donors were more than the female donors which could be due to low haemoglobin level in females, other inclusion criteria like; absence of menstruation, lactation, pregnancy etc, and the fears usually exhibited by females to donate blood as a result of lack of adequate awareness on the importance of blood donation. Blood Transfusion Professionals should therefore take blood donation awareness as part of their duties.**

Keywords: **Frequency, blood groups, blood donors, south-west.**

1. INTRODUCTION

When blood transfusion was first attempted among men and animals alike, different problems were encountered. The Pope Innocent VIII was first case of blood transfusion when he was transfused in July, 1492 with blood donated by three volunteer youths, but which later claimed lives of the innocent donors and the recipient [1]. There was no knowledge about blood group systems until in 1900, when Karl Landsteiner reported a series of test that identifies ABO Blood Group System, which is known as the most important blood group system in human blood transfusion because is the only blood group system in which antibodies are consistent, predictable and naturally present in the serum of people in which the corresponding antigens are not found. ABO compatibility is crucial between donor and recipient since these strong, naturally occurring A and B antibodies are of IgM type and can readily activate complement system and cause agglutination [2, 3].

It was proved by Scientists in 1910, that the ABO antigens were inherited, and that the A and B antigens were inherited co dominantly over O. It was initially confusing how a person's blood type was determined, but the puzzle was solved in 1924 by Bernstein's "three allele model". The ABO blood group antigens are encoded by one genetic locus, the ABO locus, which has three alternative (allelic) forms—A, B, and O. A child receives one of the three alleles from each parent,

giving rise to six possible genotypes and four possible blood types (phenotypes) [2, 4]. It is now known that ABO blood groups are determined by genes on chromosome 9, and they do not change as a result of environmental influences during life. An individual's ABO type results from the inheritance of 1 of 3 alleles (A, B, or O) from each parent. Both A and B alleles are dominant over O. As a result, individuals who have an AO genotype will have an A phenotype. People who are type O have OO genotypes. In other words, they inherited a recessive O allele from both parents. The A and B alleles are codominant. Therefore, if an A is inherited from one parent and a B from the other, the phenotype will be AB. Agglutination tests will show that these individuals have the characteristics of both type A and type B blood [5].

ABO antibodies are of major clinical significance in blood transfusion because they are naturally occurring, they are found universally and they are highly reactive. The routine practice of blood typing and cross matching blood products should prevent adverse transfusion reactions caused by ABO antibodies. However, clerical error can result in "the wrong blood" being transfused into a patient, an error which can result in the death of the patient [6]

It has been reported that blood group O is the most common blood type throughout the world, particularly among peoples of South and Central America [7]. This research work is therefore embarked upon to know the frequencies of ABO blood groups in this part of the country.

2. MATERIALS AND METHODS

***Study Site and Subject Selection*:**

Ado-Ekiti is the capital of Ekiti State, situated in the tropical rain forest belt of Southwest of Nigeria and is about 450km from Abuja (the capital city of Nigeria).
Seven Thousand Two Hundred and Forty Two volunteers were recruited at the Blood Bank of Ekiti State University Teaching Hospital Ado-Ekiti between January 2009 and October 2014. The volunteers were healthy looking blood donors who had come to donate blood either as relative donor, voluntary donor or commercial donor and had met the criteria for blood donation such as haemoglobin level of ≥13.33g/dl for males and ≥12.0g/dl for females, absence of menstruation, lactation, pregnancy and screened free from any TTI. All the subjects used were above 18 years and gave their informed consents.

Methodology:

4ml of blood was aseptically collected from each subject into plain bottles. Each blood sample was incubated for one hour at room temperature (25º) for clotting and clot retraction. It was spun and sera separated into plain khan tubes labeled appropriately. Cells harvested from the clotted blood was used to carry out blood grouping by tube method using commercially prepared antisera supplied by Atlas Medicals Ltd UK. The corresponding serum from each subject was used to carry out serum grouping simultaneously with the aid of standard cells A, B and O.

3. RESULTS

The table below shows the yearly frequencies of ABO blood group among the blood donors in Ekiti. It is shown in the table that more than One Thousand donors donate blood at the Blood Bank each year except year 2010 which has less than One thousand donors. The table shows that blood group O is the most frequent blood group among the donors throughout the years of this study while it shows variation between blood group A and B, and blood group AB takes the lowest frequency all through.

Table 1: Yearly frequencies and percentage of ABO blood groups among blood donors in Ado-Ekiti, Ekiti State.

	'09 Freq.(%)	'10 Freq.(%)	'11 Freq.(%)	'12 Freq.(%)	'13 Freq.(%)	'14 Freq.(%)
Blood Grp A	219(17.0)	110(11.9)	135(12.3)	124(10.8)	240(14.1)	144(13.2)
Blood Grp B	217(16.8)	117(12.7)	140(12.7)	139(12.1)	189(11.1)	148(13.6)
Blood Gro AB	4 (0.3)	4(0.4)	5(0.4)	3(0.3)	9(0.5)	5(0.5)
Blood Grp O	848(65.8)	692(75.0)	820(74.0)	880(76.8)	1260(74.2)	790(72.7)
Total	1288	923	1100	1146	1698	1087

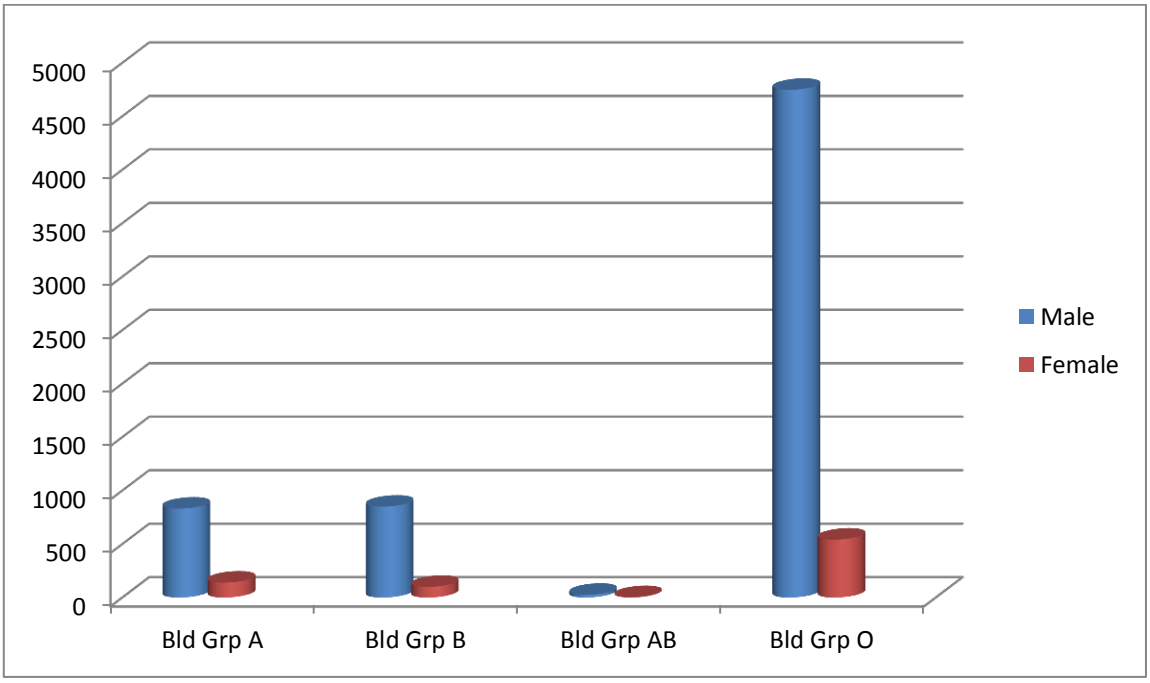

Figure 1: frequencies of ABO blood group among male and female donors in Ekiti, South-West, Nigeria.

The figure above shows that all the different blood groups i.e blood group O, A, B and AB has higher number of males than females. In blood group A, 832 were males while 140 were females. In group B, 850 were males while 100 were females. In group AB, 26 were males while 4 were females and in group O, 4748 were males while 542 were females.

4. DISCUSSION AND CONCLUSION

Seven Thousand Two hundred and Forty-Two Males and Females that come to donate blood either as relative donors, voluntary donors or commercial donors and with the age of 18years and above, at the Blood Bank of Ekiti State University Teaching Hospital were recruited for this study. Out of which Six thousand Four Hundred and Fifty-Six are males while Seven Hundred and Eighty-Six Are females.

As shown in the table above, years 2010, 2011, 2012 and 2014 have highest frequency of blood group O, followed by blood group B and then group A, which correspond with the report of Muhibi and colleagues who gave the proportions of Group A and B individuals to be 21.1% and 21.3% respectively, and group O to be 53.6% in Osun [8]. But the result of the year 2009 and that of 2013 show that blood group O is the most frequent blood group, followed by blood group A and then B while AB is the least frequent group and this correlates with report of Iyiola and co-researchers who gave the following reports; (23.1%), (21.3%), (2.7%) and (52.9%) for blood groups A, B, AB and O respectively [9] and also support [10] who ranked the frequencies of ABO blood groups in United States as O>A>B>AB.

In general, this research work shows that blood group O is the most frequent blood group among blood donors in Ado-Ekiti and its metropolis followed by blood group A and then B while AB is the least frequent group and this support the reports of [9, 10] but against the reports of [8, 11**]**. The highest frequency of blood group O is due to the ability of the group O individual to donate to other blood groups other than group O because of the lack of both antigens A and B that can bring about any reaction and the fact that blood group O is the commonest blood group in almost all populations all over the world as reported by the Encyclopedia and other researchers [7, 8, 9].

In conclusion, it is discovered also that male donors are more than the female donors which could be due to low hemoglobin level in females and other inclusion criteria like; absence of menstruation, lactation, pregnancy etc, and fear usually exhibited by the females to donate blood and this is suggested to be as a result of inadequate orientation on the importance of blood donation. Blood Bank Professionals should therefore endeavor to take blood donation awareness as part of their duties so that the public (both male and female) can be adequately informed on the importance of blood donation and be encouraged to donate blood.

ACKNOWLEDGEMENT

We want to use this medium to appreciate the most high God who made this research work a reality, we return all glory back to Him.

We also want to appreciate all the staff in the department of Hematology and Blood Transfusion who has contributed their quota in one way or the other to seeing to the success of this study. We cannot but thank all the individuals that surrendered themselves to be used as subjects for this research work; we say a big thanks to you all.

REFERENCES

[1] Knowles S and Poole G . Human blood group systems. In: Murphy MF and Pamphilon DH (editors). Practical Transfusion Medicine. 1st edition. Blackwell Science; London, UK: 2002;Pp24-31.

[2] Dean L. Blood groups and red cell antigens. The ABO blood group. National Center for Biotechnology Information (NCBI), National Library of Medicine, National Institutes of Health, Bethesda.2005; 20892-6510.

[3] Schroeder M.and Jensen M. ABO blood group system; Antigens and AntibodiesDaniels G. Human Blood Groups, Blackwell Science. Second ed. 2002.

[4] Daniels G. Human Blood Groups, Blakwell Science. Second ed. 2002.

[5] Yamamoto F, Clausen H, White T, Marken J, Hakomori S. Molecular genetic basis of the histo-blood group ABO system. Nature. 1990;345:229–33

[6] Williamson LM, Lowe S, Love EM, Cohen H, Soldan K, McClelland DB, Skacel P, Barbara JA. Serious hazards of transfusion (SHOT) initiative: analysis of the first two annual reports. BMJ.1999;319:16–9.

[7] Editors of Encyclopaedia Britannica. ABO blood group system. Encyclopaedia Britannica 2014.

[8] Muhibi M. A, Hassan R. O, Zakariyahu T. O, Tijani B. A, Hassan W. O, Muhibi M O. Frequencies of ABO blood groups and haemolysins in osogbo, south-western Nigeria. Int J Biol Med Res 2012;3(1): 1248-1250.

[9] Iyiola O.A., Igunnugbemi O.O., Bello O.G.Gene frequencies of ABO and Rh(D) blood group allelesin Lagos, South-West Nigeria. The Egyptian Journal of Medical Human Genetics (2012) 13, 147–153

[10] Dennis O'Neil. Stanford School of Medicine: Blood Center. Copyright © 1999-2012

[11] Purushottam A. Giria, Sankalp Yadav b, Gaurav Singh Parhar b, Deepak B. Phalke. Frequency of ABO and Rhesus Blood Groups: A Study from a Rural Tertiary Care Teaching Hospital in India. Int J Biol Med Res. 2011; 2(4): 988 -990