

Frequency of Different Blood Groups among Blood Donors at Shaikh Zayed Hospital Lahore

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ABSTRACT

Background: The occurrence of ABO and Rhesus blood groups changing in divergent community of distinct regions and all over the world. The significance of blood group frequency research is not only essential for blood transfusion, transfusion medicine but also for familial and molecular study and organ transplantation.

Aim: To find out the frequency of "ABO" and "Rhesus" blood groups in Blood donors at Shaikh Zayed Hospital, Lahore.

Method: This cross sectional Descriptive Study was carried out at Blood Bank of Shaikh Zayed Hospital Lahore from 1st January 2019 to 30th June 2019. A total of 3000 blood donors having age between 18-60 years and both sexes were enrolled. ABO blood grouping & Rhesus factor was done by antigen antibody agglutination test (tube method).

Results: 2970(99%) were males and 30 (1.00 %) were females. The most common blood group found was B Positive 1010(37.4%) and least common being B Negative 10(0.3%). The incidence of Rhesus positive and negative dispersal in the present research population was found as 94% and 6%, respectively. Overall, ABO group pattern found was shown by formula B > O > A > AB which was similar among Rh-Positive individuals while Rh-Negative pattern was found as O > A > AB > B which was similar among Rh-Negative individuals.

Conclusion: Most notable blood group in donors at Shaikh Zayed Hospital is B-Positive followed by O, A and AB. Blood group AB is least occurred, while the percentage of Rh positive blood group was predominant as compared to Rh negative. Voluntary blood donors play a very significant role in blood banking in Pakistan.

Keywords: Frequency, ABO and Rhesus blood groups, Blood Donors.

INTRODUCTION

Blood groups are inherited characters (antigens) located on the surface of the cell membrane of erythrocyte blood cells. There are more than 250 antigens recognized now but the most important is the antigens released to the system of "ABO" and "Rh" in clinical practice. The 'ABO' is predominantly glycoprotein projecting above the cell membrane and the Rh antigens appear to be lipoprotein forming the integral part of the cell membrane. The knowledge is very important in clinical practice because it is associated with exchange reactions, erythroblastosis fetalis, immune complex hemolytic anaemia, tissue graft rejection.¹

The blood collected from two individual when mixed, sometime agglutination reaction occur this is due to immunological reaction. This in same case and not in other case. To solve this problem Austrian scientist Karl Landsteiner start work and finally he discovered the blood group in 1901. On this important discovery he was honored with noble prize in 1930.² "ABO" and "D" blood grouping must be performed with appropriate method by using sensitive antisera and controls. ABO blood grouping is an essential serological test carried out often during cross match³.

Actually there are three allelomorphous genes "A", "B" and "O". "A" and "B" genes manage the production of particular enzyme liable for the incorporation of one carbohydrate residue to a fundamental antigenic glycoprotein or glycolipid with a last sugar L-fructose on the red cell.⁴ Rh system is determined by presence of D-

antigen on red blood cell with the help of commercially available Anti-D antibodies. About 85% of the populations in the globe are Rh positive and 15% are Rh negative⁵. Rh-factor is an antigen present on red cell. The antigen was detected by two scientists Landsteiner and Wiener. It was first found out in Rhesus monkey and hence the name become Rh-factor. There are numerous Rh antigens but D is the most important in human.² It is suggested that antigen D is composed of four parts Rh^A, Rh^B, Rh, Rh. An individual who have Rh positive having all 04 types of mosaic, where in Rh negative none of these parts is present⁶.

According to ABO and Rh blood grouping there are eight classes of blood groups. A positive, B positive, O positive, AB positive, B positive, O positive, AB positive, A negative, B negative, O negative and AB negative. All positive groups have Rh (D) antigen on the cell membrane of their RBC in the negative groups have not⁷.

Occurrence of variant blood groups in Swat was "A" positive 25.63%, "B" positive 29.54%, "O" positive 26.04%, "AB" positive 9.78%, "A" negative 2.25%, "B" negative 2.88%, "O" negative 3.01% and "AB" negative 0.88%. The percentage of Rh positive was 90.98% and Rh negative was 9.02%⁸.

Distribution pattern of variant blood groups in Bannu "A", "B", "AB" and "O" was 31.03%, 36.3%, 7.67% and 25.07% respectively. The percentage of Rh positive and Rh negative was 89.23% and 10.77% respectively.⁹ In Sahiwal the percentage of different blood groups was recorded as "A" 22%, "B" 36.9%, "AB" 9.9% and "O" 31.3%. Rh positive

and Rh negative was recorded 87.1% and 12.9% respectively¹⁰.

Ratio of different blood groups is different in different countries and areas but in this study the focus will be only on the frequency of different ABO and Rhesus blood groups among blood donors attending Blood Bank of Shaikh Zayed Hospital, Lahore.

MATERIALS AND METHODS

This cross sectional descriptive research was comprised of 3000 blood donors and executed at Blood Bank of Shaikh Zayed Hospital Lahore from January 2019 to June 2019. Persons having age 18-60 and both genders were included. Persons having history of hepatitis B and C, hematological malignancies like leukemia, lymphoma and anemia and bleeding disorders were excluded. After the permission of head of department of Blood bank at Shaikh Zayed Hospital Lahore, data were accumulated from reports of blood donors attended as per inclusion criteria of study and registered. Data was analyzed in SPSS-18.

RESULTS

Table 1 shows that out of 3000 individuals of blood donors, majority were male individuals, i.e., 2970 (99%) and females were 30 (1%). The frequency and percentage of different ABO blood groups were B positive 1010 (37.4%), O positive 890 (29.7%), A positive 630 (21%), AB positive 290 (9.7%), O negative 120 (4%), A negative 30 (1%), AB negative 20(0.7%) and B negative 10 (0.3%) [Table 2]. The frequency and percentage of Rh blood group among these blood donors were Rh positive 2820 (94%) and Rh negative 180 (6%) as under (Table 3). The Frequency and percentage of ABO Blood groups among Rh positive Blood Donors were B positive 1010 (35.8%), O positive 890 (31.6%), A positive 630 (22.3%) and AB positive 290 (10.3%) [Table 4]. Whereas frequency and percentage of ABO Blood groups among Rh negative Blood Donors were O negative 120 (66.7%), A negative 30 (16.7%), AB negative 20 (11.1) and B negative 10 (5.6%) [Table 5].

Table 1: Frequency of genders in blood donors (n=3000)

Gender	No.	%
Male	2970	99.0
Female	30	1.0

Table 2: Frequency of ABO Blood Groups among blood donors (n=3000)

Blood group	No.	%
A ⁻	30	1.0
A ⁺	630	21.0
AB ⁻	20	0.7
AB ⁺	290	9.7
B ⁻	10	0.3
B ⁺	1010	37.4
O ⁻	120	4.0
O ⁺	890	29.7

Table 3: Frequency of Rh Blood Groups among blood donors

Blood group	No.	%
Rh+	2820	94.0
Rh-	180	6.0

Table 4: Frequency of ABO Blood Groups among Rh positive Blood Donors

Blood group	No.	%
A ⁺	630	22.3
B ⁺	1010	35.8
AB ⁺	290	10.3
O ⁺	890	31.6

Table 5: Frequency of ABO Blood Groups among Rh negative Blood Donors

Blood group	No.	%
A ⁻	30	16.7
B ⁻	10	5.6
AB ⁻	20	11.1
O ⁻	120	66.7

DISCUSSION

The importance of blood group distribution pattern research is not only essential for exchange, transfusion drugs but also for the hereditary research and organ transplantation. The frequency of ABO and Rh (D) blood groups changes in disparate groups of distinct regions and all over the world. In Pakistan many research have been conducted in disparate zones. The results of this study does not seem to change from all previous studies conducted earlier in distinct areas in population of the Pakistan. It is apparent from analysis of these divergent studies that predominant blood groups in several regions of Punjab and Khyber Pakhtunkhwa are B>O>A>AB, While in Sindh and Balochistan the sequence of frequency is O>B>A>AB.^{8,14-16} In Skardu region the frequent blood group is A,¹³ followed by B, O and AB. Rhesus positive remain the most prevalent blood group with prevalence around 90% in all research carried out throughout Pakistan.¹⁴⁻¹⁶ However in the present study, the pattern of blood groups are B > O > A > AB which is an agreement to the previous studies already conducted.

Globally there is wide disparity of blood groups in distant populations. "O" blood group is the most common in USA¹¹ and United Kingdom¹² white, thereafter by "A", "B" & then "AB". Also in India the most frequent blood group is O, come after by B, A and AB¹⁷.

In Bangladesh, the pattern of distribution of ABO blood group is O>A>B>AB¹⁸. The results obtained about frequency order have also been reported in Nepal and predominant blood group is A next O, B and AB¹⁹ In Saudi Arabia most persistently confront blood group is O, followed by A, B, and AB.²⁰ In every part of globe the blood group "AB" remains the lowest common blood group. Among the universe population Rhesus positive remains most frequent as compared to Rhesus negative blood group.

CONCLUSION

The present research has a remarkable application with regard to administration of blood bank and transfusion services in this field. Information about blood group dispersion pattern is also significant for medical research, for authentic geographical knowledge and for legal studies in the population. Such prevalence survey needs to be accomplished at all territorial levels of Pakistan.

REFERENCES

1. Paul LF, Giangrande. The history of blood transfusion, *Br J Haematol* 2000;110: 758–67.
2. Eweidah MH, Rahiman S, Ali MH, Al-Shamary AM. Distribution of ABO and rhesus (RHD) blood groups in Al-Jouf province of the Saudi Arabia. *Anthropologist* 2011; 13(2): 99–102.
3. Behra R, Joshi YR. Distribution of ABO blood group and RH (D) factor in Western Rajasthan. *Natl J Med Res* 2013; 3(1): 73–5.
4. Kondam A, Chandrashekar M. A study of “incidence of hypertension in ABO and rhesus blood group system”. *Int J Biol Med Res* 2012; 3(1): 1426-9.
5. Khattak MF, Bhatti FA. Transfusion medicine. In: Karamat KA, Awnar M, Butt T, Dawood M, eds. *Manual of laboratory medicine*. 3rd ed. 2003; 357-74.
6. Akinnuga AM, Bamidele O, Amosu AM, Ugwah GU. Distribution of ABO and Rh blood groups among major ethnic groups of medical students of Madonna University Teaching Hospital, Elele, Nigeria. *Asian J Med Sci* 2011; 3(3): 106-9.
7. Alzahrani FM, Shaikh SS, and Rasheed MA. Frequency of ABO-rhesus blood groups in the western region of Saudi Arabia. *JKAU Med Sci* 2018; 25 (1): 9-13.
8. Khattak ID, Khan TM, Khan P, Shah SMA, Khattak ST, Ali A. Frequency of ABO and rhesus blood groups in district Swat, Pakistan. *J Ayub Med College* 2008; 127-9.
9. Shoaib M, Subhan F, Tahir F, Mazhar B, Dil AS, Sultan S, et al. Prevalence of blood groups and Rh factors in Bannu region. *Pak J M Res* 2004; 43 (1): 8-10.
10. Anees M, Jawad A. Distribution of ABO and Rh blood group alleles in Mandi Bahauddin district of Punjab, Pakistan. *Proc Pak Acad Sci* 2007; 44(4): 289-94.
11. Apecu RO, Mulogo EM, Bagenda F, Byamungu AM. ABO and Rhesus (D) blood group distribution among blood donors in rural south western Uganda: a retrospective study. *BMC Res Notes* 2016; 9: 513.
12. Frances TF. Blood groups (ABO groups). In: *Common Laboratory and Diagnostic Tests*. 3rd ed. Philadelphia: Lippincott, Williams & Wilkins; 2002: 19-25.
13. Alam M. ABO and Rhesus blood groups in potential blood donors at Skardu (Northern areas). *Pak J Pathol* 2005; 16:94-7.
14. Khan MS, Farooq N, Qamar N et al. Trend of blood groups and Rh factor in twin cities of Rawalpindi and Islamabad. *J Pak Med Assoc* 2006; 56(7):299-302.
15. Mahmood MA, Anjum AH, Train SMA, et al. Pattern of ABO and Rh blood groups in Multan region. *Ann king Edward Med Uni* 2005; 11(4):394-5
16. Ali N, Anwar M, Bhatti FA et al. Frequency of ABO and Rh blood groups in major ethnic groups and casts of Pakistan. *Pak J Med Sci* 2005; 21(1):269.
17. Canadian Blood Services - Société canadienne du sang. Types & Rh System Canadian Blood Services. Retrieved 2010-11-19.
18. Talib VH. *Handbook of medical laboratory technology*. 2nd ed. New Delhi: CBS Publisher; 1991.
19. Ghasemi N, Ayatollahi J, Zadehrahmani M, Nasiri A, Abedi A, Shokraneh S, et al. Frequency of ABO and Rh blood groups in middle school students of Yazd Province. *Iran J Ped Hematol Oncol* 2010; 1 (1) :27-30.
20. Periyavan S, Sangeetha SK, Marimuthu P et al. Distribution of ABO and Rhesus-D blood group in and around Bangalore. *Asian J Transfus Sci* 2010; 4(1):41.