

Frequency of ABO and Rh blood groups in Healthy Donors

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Abstract

Background: To document the frequency of ABO and Rh blood groups in volunteer non-remunerated blood donors of Rawalpindi/ Islamabad

Methods: Record of blood donors from Jamila Sultana Thalassaemia Foundation was analyzed for ABO and Rh blood groups from Sept 2005 to Mar 2008. Double/multiple entries were excluded.

Results: Among voluntary blood donors 3519(79.5%) were males and 907(20.5%) were females. Blood group B+ve was the most frequent (31.2%). AB -ve was the least frequent (0.6%). Frequency of Blood groups A+ve, AB+ve, O+ve, A-ve, B-ve, and O - ve was 21.5%, 9.8%, 29.7%, 1.8%, 2.9%, and 2.5% respectively. The percentage of Rh+ and Rh- blood groups was 92.2% and 7.8% respectively.

Conclusion: Blood group B+ was commonest and AB- was least frequent among donors. Rh+ blood group was 92.8%. There was no significant difference in males and female donors

Introduction

The surface of our red blood cells contains different sugars and proteins called blood group antigens. Ability to form these substances is inherited. Humans have many blood group systems so that each individual has a unique spectrum of blood groups with exception of identical twins and triplets only.

ABO blood groups were discovered by Landsteiner in 1901. Later on in 1939 Rhesus blood groups were discovered by Landsteiner and Wiener^{1,2}. Apart from transfusion science, blood groups have also been studied in association with various diseases e.g. salivary gland tumors, colorectal cancer, carcinoma stomach, thyroid disorders, ovarian tumors and small cell lung cancer³⁻⁷.

This study was designed to find out ABO and Rh blood groups frequencies in healthy non-remunerated blood donors, who donated blood for beta thalassaemia major patients.

Subjects and Methods

The study was carried out from Sept 2005 to Mar 2008 at Jamila Sultana Foundation. Blood samples from healthy blood donors were analyzed for serological phenotyping for ABO and Rhesus blood groups by slide method. On a labelled slide a drop of ant - A, anti - B and anti -D was placed and a drop of blood from finger prick sample added to each and mixed. Results of agglutination were recorded after mixing. The data of all donors was recorded on a proforma

Results

A total of 4426 donors were analyzed for their blood groups. Among them 3520(79.5 %) were males and 907 (20.5 %) were females.

2754 donors were students of various colleges and universities, 335 were madrasa students 446 were employees of different NGO's and private institutions. 57 were government employees and 360 were walk-in donors.

Blood group B+ was the most frequent (31.2%). AB- was the least frequent (0.6%). Frequency of Blood groups A+, AB+, O+, A-, B-, and O- was 21.5%, 9.8%, 29.7%, 1.8%, 2.9%, and 2.5% respectively. (Table 1) 92.2% were Rh positive and 7.8% were Rh negative

Discussion

Ever since the discovery of ABO blood groups by Landsteiner and his pupils, comprehensive works have accumulated in literature on the relation of ABO blood groups to transfusion, on its anthropological and genetical applications, on its use in medico-legal identification and disputed paternity and also on its relationship to various diseases.

Our study population was concentrated around twin cities of Rawalpindi and Islamabad. In our study blood group B was found to be most frequent. The results are comparable with studies from other cities of Punjab and NWFP⁸⁻¹¹. In Sindh and Baluchistan blood group O was relatively more common. This reflects clustering of genes in various geographical parts of the

country. Blood group AB was the rarest group in all studies within Pakistan and abroad (Table 2),¹²⁻¹³.

Table 1: Frequency of ABO blood group distribution among donors

Sex	No of Donors	O+	O-	A+	A-	B+	B-	AB+	AB-
Male	3519	1038	82	757	69	1090	104	354	25
Female	907	276	27	197	12	287	24	81	3
Total	4426	1314	109	954	81	1377	128	435	28

Table 2: Comparison of ABO blood group distribution among different areas of Pakistan

Blood group	This study	Mandi Bahauddin	Peshawar	Swabi	Wah cantt	Gujrat	Hazara	Bannu	Bahawalpur
A	23	13.8	28	28	18	18	24	31	21
B	34	26.3	34	30	24	22	32	37	36
AB	11	4.5	7	9	5	4	11	7	6
O	32	55.4	31	33	53	56	33	25	37

Table 3: Comparison of ABO blood group distribution among different areas of world with our study

Blood group	This study	Gaza	Saudi Arabia	Egypt	Syria	Lebanon	Germany	Turkey	Britain	Nigeria
A	23	39	24	34	46	47	26	12	42	24
B	34	21	17	21	13	12	8	12	8	24
AB	11	7	4	9	3	5	2	1	3	3
O	32	33	52	36	37	36	64	75	47	49

Table 4: Comparison of Rh blood group distribution among different areas of Pakistan

Blood group	This study	Mandi Bahauddin	Bannu	Islamabad	Lahore	Gujrat	Peshawar	Wah cantt
Rh+	92.8	91.4	67.2	72.9	71.7	79.5	76.8	73.9
Rh-	7.8	8.6	32.8	26.1	26.3	20.5	23.2	26.1

In the world we see variable distribution of blood groups in different geographical areas. Thus blood group O is more prevalent in Turkey, Hungary, Ukraine, Germany, and Nigeria, while in Arab countries like Lebanon and Jordan blood group A was more commonly seen (Table 3)¹⁴⁻²⁰.

In Pakistan the blood group O is most prevalent in Bahawalpur, Wah Cantt, Gujrat and Mandi Bahauddin²²⁻²⁴.

Rh positive population was 92% in our study. This distribution is though comparable with findings in Mandi Bahauddin, but it differs greatly with other studies (Table 4). The difference needs to be further explored. Our figures are, however, more close to

international figures.

References

- Garratty G, Dziik W, Issitt PD, Lublin DM, Reid ME, Zelinski T. Terminology for blood group antigens and genes – Historical origins and guideline in the new millennium. *Transfusion* 2000; 40:477-89
- Mollison PL. The genetic basis of Rh blood group system. *Transfusion* 1994; 34:539-41
- Pinkston JA and Cole P. ABO blood groups and salivary gland tumors. *Cancer Causes Control* 1996; 7:572-74
- Slater G, Itzkowitz S, Azar S and Aufses AH. Clinicopathological correlations of ABO and Rhesus Blood types in colorectal cancer. *Dis Colon Rectum* 1993; 36:5-7

5. Klechova L, and Gosheva- Antonova TS. ABO and Rh blood group factors in thyroid gland diseases. *Vutr Boles* 1980; 19:75-93
6. Bjorkholm E. Blood Group distribution in women with ovarian cancer. *Int J Epidemiol* 1984 13:15-17
7. Cerny T, Fey MF, Oppliger R, castiglione RA, Nachbur B, Gertsch M, et al Prevalence of Rhesus negative phenotypes in Caucasian patients with small cell lung cancer. *Int J Cancer* 1992; 52:504-06
8. Rehman M and Lodhi Y. Frequency of ABO & Rhesus Blood Groups in blood donors in Punjab. *Pak J Med Sci* 2004; 20(4) 315-18
9. Majeed T, Hayee A. Prevalence of ABO blood groups & sub-groups in Lahore, Punjab (Pakistan). *Biomedica* 2002; 18:11-15
10. Zafar NJ, Hassan K, Bukhari K. Prevalence of ABO and Rh blood groups amongst voluntary blood donors. *J Rawal Med Coll* 1997; 1(2): 78-80
11. Khan MS, Sibtain F, Tahir F, Kazi BM, Dil AS, Sultan S, et al Prevalence of blood groups and Rh factor in Bannu region NWFP (Pakistan). *Pak J Med Res* 2004; 43(1): 8-10
12. Bhatti R, Sheikh DM: Variation of ABO Blood Groups. General frequencies in the population of Sindh (Pakistan). *Ann KE Med Coll* 1999; 5(3-4): 328-31
13. Hussain A, Sheikh SA, Haider M, Rasheed T, Malik MR: Frequency of ABO and Rh Blood Groups in population of Balouchistan (Pakistan). *Pak Armed Forces Med J* 2001; 51(1) 22-26.
14. Talib VH. Hand book of Medical laboratory Technology. 2nd edition CBS Publishers. New Delhi, India. 1991 Pp.205-10
15. Mukhin VN. 1999. Gene frequencies and heterozygosity of the population of Donetsk Province, Ukraine by the alleles of the ABO and Rhesus systems. *Tsitol Genet.* 33; 10-30
16. Wagner FF, Kasulke D, Kerowgan M and Flegel WA. Frequencies of blood groups ABO, Rhesus D, Kell and of clinically relevant high frequency antigens in southwestern Germany. *Infusions Transfusions Med* 1995; 22:2285-90
17. Mathew EE , Godwin NB. Distribution of ABO and Rh-D blood groups in the Benin area of Niger delta: implication of regional blood transfusion. *Asian J Transf Sci.* 2008; 2(1):3-5
18. Nasif E. The incidence of blood groups in Lebanese. *Lebanon Med J* 1953; 6:346-49
19. Hanania S, Hassawi D, Irshaid N. Allele frequency and molecular genotypes of ABO blood group system in Jordanian population. *J Med Sci* 2007; 7(1):51-58
20. Lale D and Eyyup R. Frequency of blood group antigens and corresponding alleles in Mediterranean region of Turkey. *Haema* 2002; 5(4):326-29
21. Youaf M, Yousaf N and Zaidi A. Pattern of ABO and Rh(D) blood group distribution in Bahawalpur division Pak J Med Res. 1988; 27:40-41
22. Anees M and Shabbir M. Distribution of ABO and Rh blood groups in Gujrat region, Punjab. *Pak Proc Pakistan Academy of Sci* 2005; 42:233-38
23. Anees M, Aksa J and Hashmi I. Distribution of ABO and Rh blood group alleles in Mandi Bahauddin district of Punjab, Pakistan. *Proc Pakistan Acad Sci.* 2007; 44(4):289-94