



TO STUDY THE DISTRIBUTION OF ABO BLOOD GROUP AND RH(D) FACTOR IN A GOVT. HOSPITAL LAB, RAMNAGAR, UK.

Ekta Tiwari Assistant Professor, Rajshree Medical College, Bareilly, UP

Stuti Bhuwan Assistant Professor, Prasad Institute of Medical Sciences, UP

Saurabh Mishra Laproscopic Surgeon, Ujala Hospital, Uttarakhand

ABSTRACT **Background:** India is a vast country with lot of diversity in race, religion and creed and the same diversity has been observed in geographical distribution of ABO and Rh blood groups.² This study aimed to identifying the frequency distribution of ABO blood group and rhesus factors among patients coming to government hospital of ramnagar.¹ **Objectives:** A retrospective study was conducted at Government Hospital Ramnagar over a period of 6 months from April 2022 to September 2022 to determine and compare the distribution of ABO and Rh blood groups. **Materials and Methods:** A retrospective study of 6 months was carried out at our lab in Government Hospital, Ramnagar Uttarakhand, North India. Data pertaining to the blood groups of donors was collected from the OPD and IPD register from April 2022 to September 2022. **Results:** The total donors studied were 1499. The distribution of blood groups was: blood group 'A' 375 (25%), 'B' 516 (34.4%), 'AB' 172 (11.5%) and 'O' 436 (29.1%). In both Rh D positive and Rh D negative person's blood group 'B' was the commonest followed by blood group 'O'. Blood group 'AB' is the least common. **Conclusion:** The "B" blood group is significantly high in our population and comparatively low "AB" blood group. Also the percentage of Rh D negative blood group was 4.8%. The study of distribution of blood group is very important for blood banks and transfusion services that could contribute to the patients' health care.

KEYWORDS : ABO blood group, Rh (D) factor, Blood Bank

INTRODUCTION

Human red blood cells contain on their surface a series of glycoproteins and glycolipids, which constitute blood group antigens. Development of these antigens are genetically controlled, inherited in a mendelian fashion and appear early in fetal life and remain unchanged till death.⁴ Blood group antigens are inherited biological characteristics that do not change throughout life in healthy people and represent antigens found on the surface of red blood cells.³ The ABO blood group system was the first human blood group system to be discovered by Landsteiner in 1901.⁵ Later Landsteiner and Wiener defined the Rh blood group in 1941.⁶ Together these two systems have proved to be the most important, for blood transfusion purposes.

The ABO blood group system is divided into four blood types on the basis of presence or absence of A and B surface antigens. The blood groups are ABO and AB. ABO blood group system is important because of the fact that A and B are strongly antigenic and anti A and anti B are naturally occurring antibodies present in the serum of persons lacking the corresponding antigen. These antibodies are capable of producing intravascular hemolysis in case of incompatible transfusion.⁷

Rh antigens are highly immunogenic. Out of 49 Rh antigens identified till now, D antigen is most significant. D negative individuals produce anti-D if they encounter the D antigen through transfusion or pregnancy and causes hemolytic transfusion reaction, or hemolytic disease of fetus and newborn. For this reason, the Rh status is routinely determined in blood donors, transfusion recipients, and in mothers-to-be.⁸

All human populations share the same blood group systems; although they differ in the frequencies of specific types. The incidence of ABO and Rh groups varies markedly in different races, ethnic groups, and socio-economic groups in different part of the world.⁹

MATERIAL AND METHODS

The study was conducted on 1499 blood donors. ABO and Rh typing was done using agglutination method with antisera ABO and Rh. Doubtful cases were confirmed by tube agglutination method and reverse grouping using known pooled A and B CELLS. The age group and sex of donors, frequency of ABO and Rh blood groups were reported in simple percentages.

OBSERVATION AND RESULTS

Blood grouping of 1499 donors was done. The predominant donors belonged to age group between 21-30 years (75.8%) and least were of age group 50 and above. Female donors were more than male donors, ratio being 29:1. The most common blood group was B and least common being AB. Blood group O and A had almost same frequency. In the Rh blood group, Rh positive donors (95.2%) were much more than Rh negative donors (4.8%).

Table 1: Frequency Distribution of ABO and Rh Blood Groups in the Current Study

ABO Blood group	Rh Positive	Percentage (%)	Rh Negative	Percentage (%)	Total	Percentage (%)
A	352	23.4%	23	1.53%	375	25%
B	495	33.0%	21	1.4%	516	34.4%
AB	165	11.0%	7	0.46%	172	11.5%
O	415	27.6%	21	1.4%	436	29.1%
Total	1427		72		1499	

Blood group frequency with respect to ABO and Rhesus positive was found to be shown by formula $B > O > A > AB$ which is in accordance with other studies. The frequency for ABO and Rhesus negative was given by the formula $A > B > O > AB$.^{10,11}

Outside India, in Pakistan¹², the commonest blood group is B which is same as in our study. The study done at Nepal¹ found the commonest blood group was A, whereas in studies done in most parts of India the commonest blood group is either B or O.

Countries in other parts of the world like Britain¹⁴, Australia¹⁶, showed the frequency of blood group O being highest which is in contrast to the present study.

Distribution of Age Groups Among Study Population (n=1499)

Age group (in years)	Number of donors
0-10	33
11-20	97
21-30	1137
31-40	191
41-50	17
51-60	17
60 and above	7

Most common age group encountered was 21-30. The least donors were of age group 60 and above.

Distribution of Donors According to Gender

Gender	No of donors	Percentage (%)
Male	50	3.3%
Female	1449	96.6%

The present study showed large number of females as compared to males donors which is mainly because most of the women were ANC.

Distribution of Donors According to Religion

Religion	No of donors	Percentage (%)
Hindu	907	60.5%
Muslim	592	39.5%

Distribution of Donors According to Rh D

Rh D	No of donors	Percentage (%)
Positive	1427	95.2%
Negative	72	4.8%

Rh negativity status was 4.8% in our study and is in accordance with the studies conducted at other places in India and is in contrast with western studies^{14,15} where it was reported it as 15-17%.

Apart from transfusion service, knowledge of ABO and Rh blood groups are useful in population genetic studies, researching population migration patterns as well as resolving certain medicolegal issues particularly disputed parentage and preventive measures against the diseases which are associated with different blood groups. Studies concerned about possible association between ABO blood.

CONCLUSION

The present study concludes that most common blood group is 'B' and least common is AB amongst the OPD and IPD patients attending govt hospital in ramnagar, UK. Blood group A and O showed equal frequency. Regarding Rhesus blood group system, Rh positive donors were 95.2% and Rh negative were 4.8%. The data generated in the present study and several other studies of different geographical region of India will be useful to health planners to face the future health challenges in the region.

The blood group of every individual must be indicated on national identity cards, driving licenses and school/office identity cards. This will be of tremendous use in case of emergencies when urgent transfusion of yet to be cross matched blood is required. It is necessary to conduct similar well designed studies in other states of India in order to determine the blood group frequencies in them.

REFERENCES

- Smart E, Armstrong B. Blood group systems. ISBT Sci Series. 2020;15:123–150. doi:10.1111/voxs.12593
- A Patel Piyush, P Patel Sangeetha, V Shah Jigesh, V Oza Haren. Frequency and Distribution of Blood Groups in Blood Donors in Western Ahmedabad – A Hospital Based Study. Natl J Med Res. (2012); 2(2): 202-206.
- Milanović MK, Bujandrić N, Knežević NM. PROBLEM DAVALACA KRV I RETKIH KRVNIH GRUPA SA IREGULARNIM ANTITELIMA [Rare blood donors with irregular antibodies]. Med Pregl. 2013;66(7–8):331–334. Serbian.doi:10.2298/MPNS1308331K
- Firkin F, Chesterman C, Penington D, Rush B. In: de Gruchy's clinical hematology in medical practice. 5th ed. New Delhi: Oxford University Press; 1989. Blood groups; blood transfusion; acquired immune deficiency syndrome; pp. 475–96.
- Garraty G, Dzik W, Issitt PD, Lubin 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.
- Rahman M, Lodhi Y. Frequency of ABO and Rhesus blood groups in blood donors in Punjab. Pak J Med Sci. 2004;20:315–18
- Harmening MD, Firestone D. Modern Blood Banking and Transfusion Practices. 5th ed. USA: FA Davis Company, Philadelphia, USA; 2005. The ABO blood group system. In: Harmening MN, editor; pp. 108–32.
- Khan MS, Subhan F, Tahir F, Kazi BM, Dil AS, Sultan S. Prevalence of blood groups and Rh factor in Bannu region NWFP (Pakistan) Pak J Med Res. 2004;43(1):8–10
- Sidhu S, Sidhu L S. ABO blood group frequencies among the Sansis of Punjab. Coll Anthropol. 1980;4:55–58.)
- Khattak ID, Khan TM, Khan P, Shah SM, Khattak ST, Ali A. Frequency of ABO and Rhesus blood group in district Swat, Pakistan. J Ayub Med Coll. 2008;20(4):127–29. [PubMed] [Google Scholar]
- Pramanik T, Pramanik S. Distribution of ABO and Rh blood groups in Nepalese medical students: a report. East Mediterr Health J. 2000 Jan;6(1):156–58. [PubMed] [Google Scholar]
- Khattak ID, Khan TM, Khan P, Shah SM, Khattak ST, Ali A. Frequency of ABO and Rhesus blood group in district Swat, Pakistan. J Ayub Med Coll. 2008;20(4):127–29. [PubMed] [Google Scholar]
- Pramanik T, Pramanik S. Distribution of ABO and Rh blood groups in Nepalese medical students: a report. East Mediterr Health J. 2000 Jan;6(1):156–58. [PubMed] [Google Scholar]
- Frances TF. In: Common Laboratory and Diagnostic Tests. 3rd Edition. Philadelphia: Lippincott; 2002. Blood groups (ABO groups) pp. 19–15. [Google Scholar]
- Mollison PL, Engelfriet CP, Coneras M. In Blood Transfusion in Clinical Medicine. 9th Edition. Oxford: Black well Scientific Publication; 1993. The Rh blood Group system; pp. 2008–09. [Google Scholar]
- Australian Red Cross Society. All about blood. URL; www.donateblood.com.au/all-aboutblood/blood-types.