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Original Research Article

Distribution of ABO blood group and Rh(D) Factor among Blood Donors in Haryana

Pawan Singh*, Puja Sharma, Shivani Kalhan, Rahul Satarkar, Sheetal Gole and Neha Garg

Department of Pathology, SHKM Govt. Medical College, Nalhar, Nuh, Distt. Mewat, Haryana, 122007

***Correspondence Info:**

Dr. Pawan Singh,

Assistant Professor,

Department of Pathology,

SHKM Govt. Medical College, Nalhar, Nuh, Distt. Mewat, Haryana, 122007

E-mail: bodwalps@gmail.com**Abstract**

Introduction: India is a vast country with wide diversity in race, religion & creed. The same diversity has been observed in geographical distribution of blood groups in population within country.

There are differences in the distributions of ABO, & Rh(D) blood groups amongst different populations. The study of blood grouping is important as it plays an important role in various genetic studies, in clinical studies for reliable geographical information and in blood transfusion practice as it will help a lot in reducing the morbidity and mortality rate.

Methods: This study presents data about the prevalence of ABO & Rhesus (Rh) blood groups amongst blood donors during a period of one year (retrospective study from January 2014 to December 2014) conducted at Blood Bank of Shaheed Hasan Khan Mewati Govt. Medical College, Nalhar, Distt. Mewat, Haryana, India

Results: During the study period, blood groups of 2724 donors were screened by antigen antibody agglutination method using commercially available antisera which were validated at our Blood Bank. The study revealed that the commonest ABO blood group was B (38.83%) followed by O (28.70 %), A (22.90 %) and AB (9.54 %) respectively. Rh D Positive blood donors were 90.72 % and Rh D negative were 9.28 %.

Keywords: ABO blood group, Rh factor, blood donors

1. Introduction

The ABO blood group system was the first human blood group system to be discovered by Landsteiner in 1900. The ABO blood group system is the only system in which antibodies are consistently and predictably present in the serum of normal individuals whose red cells lack the antigens.[1] Apart from differences amongst species, differences between the individuals of the same species have also been demonstrated. During the World wars, it was discovered for the first time that the frequency of ABO and Rhesus blood groups was different in persons native to different parts of the world. Attempts have been made to classify the racial groups of mankind according to the incidence of known blood groups.[2] The second type of blood group is the rhesus system. There are only two Rh phenotype, i.e. Rh positive and Rh negative,

depending on whether Rh antigen is present on the red cell or not. Determination of ABO blood groups is done by detecting A and B antigens. In addition, known red cells are used to detect anti-A and anti-B in the serum, by a process called 'reverse' grouping. ABO and Rh gene phenotypes vary widely across races and geographical boundaries[3]-[5] despite the fact that the antigens involved are stable throughout life. The resultant polymorphism remains important in population genetic studies, estimating the availability of compatible blood, evaluating the probability of hemolytic disease in the new born, resolving disputes in paternity/maternity and for forensic purposes.[6][7] The frequency of ABO and Rh phenotypes in different populations has been extensively studied. Different blood groups have been shown to be particularly associated with

different diseases as well.[8][9] Rh system emerged as second most important blood group system due to hemolytic disease of newborn and its importance in RhD negative individuals in subsequent transfusions once they develop Rh antibodies.[1] The D antigen, after A and B, is the most important red cell antigen in transfusion practice. Unlike the situation with A and B, persons whose red cell lacks the D antigen do not regularly have anti D in their serum. The present study was done to assess the prevalence of blood groups in blood donors in Haryana and to compare our results with other studies conducted in India and elsewhere in the world.

2. Material & Methods

A retrospective study of one year was carried out at our Blood Bank, in a tertiary care health institute, in rural area in Haryana. Blood group determination of donors was done from January 2014 to December 2014. Total 2724 donors were considered medically fit & donated blood during the study period. All were in the age group of 18-65 years. After blood donation, blood grouping ABO & Rh was done by antigen antibody agglutination test by commercially available standard antisera i.e Anti A, Anti B, Anti AB and Anti D by test tube

agglutination method. Both forward (cell grouping) & reverse grouping (serum grouping) method were done. Final blood group was confirmed only if both forward & reverse groups are identical. The donor blood group data were recorded on a specially prepared performa and analysed.

3. Results

The total donors studied from January 2014 to December 2014 were 2724. It was revealed that the commonest ABO blood group was B (38.83%) followed by O (28.70 %), A (22.90 %) and AB (9.54 %) respectively (Table-1). The distribution of ABO Rh positive blood groups was as follows, blood group A positive 20.77 %, B positive 35.35 %, O positive 25.80 % and AB positive 8.77% (Table-2), the most common being blood group B positive. The distribution of Rhesus (Rh) D factor was as follows, 2471(90.72 %) Rh D positive and 253(9.28 %) Rh D negative. Among total 253(9.28 %) Rh D negative blood donors, B negative (3.48%) was most common followed by O negative (2.90%), A negative (2.12%), and AB negative (.77%) (Table-3). Out of 142 female blood donors, 134 were Rh D positive, 8 were Rh D negative.

Table1. Prevalence of ABO blood groups in blood donors

Blood Group	A		B		AB		O		Total
	No.	%	No.	%	No.	%	No.	%	No.
	624	22.90	1058	38.83	260	9.54	782	28.70	2724

Table 2: Rh D positive ABO Blood groups donors

Blood Groups	A Rh D positive	B Rh D positive	AB Rh D positive	O Rh D positive	TOTAL
Females	25 (17%)	59 (41.54%)	8 (5.63%)	42 (29.57%)	134 (5.44%)
Males	541 (20.92%)	904 (35.01%)	231 (8.94%)	661 (25.60%)	2337 (94.57%)
Total	566 (20.77%)	963 (35.35%)	239 (8.77%)	703 (25.80%)	2471 (90.72%)

Table 3: Rh D negative ABO blood group donors

Blood Groups	A Rh D negative	B Rh D negative	AB Rh D negative	O Rh D negative	TOTAL
Females	1 (0.72%)	5 (3.52%)	1 (0.72%)	1 (0.72%)	8 (3.16%)
Males	57 (2.20%)	90 (3.42%)	20 (0.77%)	78 (3.02%)	245 (96.83%)
Total	58 (2.12%)	95 (3.48%)	21(0.77%)	79 (2.90%)	253 (9.28%)

4. Discussion

The total blood donors studied from January 2014 to December 2014 were 2724, out of these 2582 (94.79 %) were male donors and 142(5.21%) were the female blood donors. The distribution of blood groups was as follows, blood group A positive 20.77 %, B positive 35.35 %, O positive 25.80 % and AB

positive 8.77%. In our study, B blood group was the commonest blood group among blood donors followed by O , A and AB blood groups. The studies done in Northern India by authors like Tulika *et al*[10] at Lucknow, and by Sidhu *et al*[11] at Punjab, showed blood group B to be the commonest, followed by O, A and AB. The same incidence was

found in our study i.e. B was more frequent than O and followed by A and AB blood groups. In Western parts of India like in Eastern Ahmedabad by Wadhwa et al[12], Western part of Ahmedabad by Patel et al[13] and studies done at Surat by Mehta et al[14], showed blood group B is the commonest followed by O, A and AB. Similar incidence has been found in our study. Study done at Central India by Gupta et al[15] revealed B group to be the most common followed by O, A and AB which is in consonance with the present study. Study has done in Eastern India, by Nag et al[16] showed O group to be the commonest group which is different from our study. In Southern part of India, studies done by Periyavan A et al[17], Das et al[18], Mallikarjuna et al[19] and Girish et al[20], found that the commonest blood group was O followed by B, A and AB whereas our study showed commonest blood group B followed by O, A & AB. Geographical distribution of Blood Groups in India shows that in Northern, central & Western part of India, B is the commonest blood group where as in Eastern and Southern part, O is the most frequently occurring blood group.

Outside India, in Pakistan the study done by Hamed et al[21], the commonest blood group is B which is same as in our study. The study done in Australia by Red Cross Society[22], and in USA by Mollison et al[23] the commonest blood group was O, followed by A, B & AB. The study done at Nepal by Pramanik et al[24] found the commonest blood group was A, whereas the studies done in most parts of India the commonest blood group is either B or O followed by A and then AB.

The incidence of Rh D positivity blood group in most of India varies from 94 to 98 % and Rh D negativity from 2 to 6%, whereas in our study 90.72 % were Rh D positive and 9.28 % were Rh D negative.

5. Conclusion

In this study of 2724 blood donors in rural Haryana, it was observed that the most common blood group was B (38.83%) followed by O (28.70 %), A (22.90 %) and AB (9.54%). Amongst Rhesus (Rh), 90.72 % were Rh D positive and 9.28 % Rh D negative. The knowledge of distribution of blood group is very important for blood banks & transfusion services, plays an important role in the patient's health care.

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