

ORIGINAL ARTICLE

DISTRIBUTION OF ABO BLOOD GROUP AND RH(D) FACTOR IN WESTERN RAJASTHAN

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ABSTRACT

Introduction: India is a vast country with lot of diversity in race, religion & creed. The same diversity has been observed in geographical distribution of blood groups in population within country. The ABO & Rhesus (Rh) blood group system are the most prevalent & important for transfusion of blood & its component, organ transplant, genetic studies & in legal medicine study.

Methods: This study presents data about the prevalence of ABO & Rhesus (Rh) blood groups amongst blood donors during a period of ten & half year (retrospective study from January 2002 to July 2012) conducted at Blood Bank of Mahatma Gandhi Hospital, Jodhpur associated with Dr. S. N. Medical College, Jodhpur (India).

Results: During the study period blood groups of 83631 donors were screened by antigen antibody agglutination method using commercially available antiseras which were validated at our Blood Bank. The study revealed that the commonest ABO blood group was B(36.4%), followed by O (31.7%), A(22.2%) and AB(9.4%) respectively. Rh Positive were 91.75% and Rh negative were 8.25%.

Keywords: ABO blood group, Rh factor, agglutination method

INTRODUCTION

People have different blood types, known as Blood Groups. Antigens are hereditary determined & plays a vital role in transfusion safety.

The discovery of the ABO blood groups by Karl Landsteiner was an important achievement in the history of blood transfusion followed by discovery of Rh (D) antigen. The genes of ABO & Rh (D) are located on chromosome 9 & 1 respectively. The bombardment of the red blood cells with A & /or B antigen occurs as a consequence of the action of the glycosyltransferases enzymes, that add specific sugars of conformation dependent epitopes along with the Rh (D) protein from the D antigen

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. Knowledge of distribution of ABO & Rh blood group is also essential for effective management of blood bank inventory.

The present study was aimed to document the distribution of ABO & Rh blood groups in donors who

attended Blood Bank of Mahatma Gandhi Hospital to determine the distribution of ABO & Rh Blood group in Western Rajasthan.

MATERIAL & METHOD

A retrospective study of 10 and half years was carried out at Blood Bank, M.G. Hospital, Jodhpur which is one of the major blood bank in Western Rajasthan.

Blood group determination of donors was done from January 2002 to July 2012 at Blood Bank, M.G. Hospital, Jodhpur.

Total 83631 donors were considered medically fit & donated blood during the study period. All belonged to age group between 18-55 years. After blood donation, blood grouping ABO & Rh was done by antigen antibody agglutination test by commercially available standard antiseras i.e Anti A, Anti B, Anti AB and Anti D were used after validation at Blood Bank.

Blood Group was done 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 specially formed performa.

The total donors studied from January 2002 to July 2012 were 83631. The distribution of blood groups of donors were, blood group A 22.2%, B 36.4%, O 31.7% and AB 9.4% (Table-1). The most common being blood group B. The distribution of Rhesus (Rh) factor was 91.75% Rh positive and 8.25% Rh negative (Table-1).

OBSERVATION

Table 1: Distribution of ABO & Rh Blood Group Systems.

ABO Blood Group	Rh +ve	Percentage Rh+ve	Rh -ve	Percentage Rh-ve	Total	Percentage
A	17043	20.38%	1583	1.89%	18626	22.2%
B	28034	33.52%	2463	2.95%	30497	36.4%
O	24392	29.17%	2192	2.61%	26584	31.7%
AB	7259	8.68%	665	0.8%	7924	9.4%
Total	76728	91.75%	6903	8.25%	83631	100%

Table 2: Comparative study on frequency of ABO and Rh phenotypes at different geographical areas (in percentage)

Place of Study	A	B	AB	O	Rh+ve	Rh-ve
Within India						
Northern Part of India						
Present Study	22.2	36.4	9.4	31.7	91.75	8.25
Lucknow ¹	21.73	39.84	9.33	29.10	95.71	4.29
Punjab ²	21.91	37.56	9.3	31.21	97.3	2.7
Western Part India						
Western Ahmedabad ⁴	21.94	39.40	7.86	30.79	95.05	4.95
Eastern Ahmedabad ³	23.30	35.50	8.80	32.50	94.20	5.80
Surat ⁵	24.10	34.89	8.69	32.32	94.18	5.82
Central Part of India						
Indore ⁶	24.15	35.25	9.10	31.50	95.43	4.57
Eastern Part of India						
Durgapur (Steel City) ⁷	23.90	33.60	7.70	34.80	94.70	5.30
Southern Part of India						
Bangalore ⁸	23.85	29.95	6.37	39.82	94.2	5.8
Vellore ⁹	21.86	32.69	6.70	38.75	94.5	5.5
Devanagere ¹⁰	26.15	29.85	7.24	31.76	94.8	5.2
Shimoga-Malnad ¹¹	24.27	29.43	7.13	39.17	94.93	5.07
Outside India						
Pakistan ¹²	23.8	38	10	28.2	89.1	10.9
Australia ¹³	38	10	3	49	NA	NA
USA ¹⁴	41	9	4	46	85	15
Nepal ¹⁵	34	29	4	33	96.7	3.3

DISCUSSION

The studies done in Northern parts of India by authors like Tulika Chandra et al¹ at Lucknow, and by Sidhu et al² studies at Punjab, showed blood group B was 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 MK et al³, Western part of Ahmedabad by Patel, Piyush et al⁴ and studies done at Surat by Nidhi et al⁵, showed blood group B is the commonest followed by O, A and AB which is same as in our study.

Study done at Central India like Indore by Narendra Kumar et al⁶ revealed B group to be the most common

followed by O, A and AB which is in consonance with present study.

Study done in Eastern part of India, Durgapur by Nag I et al⁷ 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 al⁸ at Bangalore, Das PK Nair et al⁹ at Vellore, and at Davanagere by Mallikarjuna S et al¹⁰ and at Shimoga-Malnad study done by Girish et al¹¹, 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 & Western part of India, B is the commonest blood group where as in Eastern,

Southern and Central part, O is the most frequently occurring blood group.

Outside India, in Pakistan the study done by Hammed A et al¹² the commonest blood group is B which is same as in our study. The study done in Australia by Red Cross Society¹³, and in USA by Mollison PL et al¹⁴ the commonest blood group was O, followed by A, B & AB.

The study done at Nepal by Pramanik et al¹⁵ 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 blood group in most of the part of India varies from 94 to 98 % were Rh+ve and 2 to 6% were Rh-ve whereas in our study 91.75% were Rh+ve and Rh-ve were 8.25%. Table-2 which depicts Rh-ve to be on the higher side in Western Rajasthan as compared to other places in India.

CONCLUSION

It is concluded that the total 83631 blood Donors were studied for group wise distribution. We observed that the most common blood group was B (36.4%) followed by O (31.7%), A (22.2%) and AB (9.4%). Amongst Rhesus (Rh) 91.75% were Rh+ve and 8.25% Rh-ve.

The study of distribution of blood group is very important for blood banks & transfusion services that could contribute to the patients health care.

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