

Distribution of ABO and Rhesus Blood Groups in Kashmir Valley

Dr. Shazia Handoo¹, Dr. Samreen Siraj Bala²

¹Lecturer, Department of Haematology and Transfusion Medicine, SMHS Hospital, Srinagar, J&K, India

²Postgraduate, Department of Anatomy, GMC, Srinagar, J&K, India

Abstract: *Background:* ABO and Rh blood group systems are major clinically significant blood group systems despite that more than 400 red cell antigens have been identified. Blood groups are genetically determined. ABO and Rh blood groups systems besides being most important in blood transfusion, also are important in forensic pathology, disease susceptibility and population genetics. This study aims to determine frequency and distribution of ABO and Rh blood groups among the population in Kashmir valley, J&K, India. *Material and Methods:* Study was done for a period of one year (March 2013 to February 2014) in the Department of Haematology and Transfusion Medicine, SMHS Hospital, Srinagar, J&K, India. Blood grouping for ABO and Rh status was done by tile agglutination method using commercially available anti-seras. *Results:* In ABO blood grouping of 7022 blood donor population most prevalent was O (34.72%) closely followed by B (33.34%) than A (23.88%) and lastly AB (8.06%) while in Rhesus grouping, Rh positive donors were maximum (91.17%) and Rh negative being only 8.83%. *Conclusion:* Blood group O is commonest in Kashmir valley and AB happens to be rarest.

Keywords: Blood groups, ABO, Rhesus (Rh), Donors, Kashmir

1. Introduction

The ABO and Rh blood group system remains so far the most significant in blood transfusion. The magnificent discovery of ABO blood group system is credited to Austrian scientist Karl Landsteiner in 1900¹. He discovered three blood groups (A, B & O) for which he was awarded Nobel prize in 1930. Fourth blood group, AB was discovered by Alfred Von Decastello and Adriano Sturli in 1902².

Although Rh (Rhesus) system was fourth blood group system to be discovered (1940)⁴ but it stands second as far as clinical importance is concerned. It can be Rh positive or Rh negative depending upon the presence or absence of antigen respectively. ABO and Rh system are genetically predetermined, genes located on chromosome 9 and chromosome I respectively.

Incidence of ABO and Rh blood groups varies in different parts of world. Factors attributed to such difference includes racial differences, geographical variation, different ethnic groups, external environment and genetic make up⁴⁻⁶. Role of ABO and Rh blood group system is not limited to transfusion safety and organ transplant only. Research on ABO blood group has been of great interest as besides primary role in immunohaematology and blood transfusion, ABO blood group system play vital role in clinical studies, genetic studies, medico-legal issues like disputed paternity and anthropology^{7,8}. Further, importance of ABO blood group distribution is greatly increasing because of their association with certain diseases. ABO blood group has also been found to be predictor of national suicide rate and genetic marker of obesity^{9,10}. Rh blood group system involved in hemolytic disease of Newborn, commonly arise when Rh negative mother carries Rh positive foetus¹¹.

Therefore it becomes imperative to have information about distribution of blood groups in any population besides generating data for health planners with multipurpose utilities in future.

2. Aims And Objectives

The present study was designed to determine frequency and distribution of ABO and Rh blood groups among donors in Kashmir valley, J&K India and compare with other data available from similar studies.

3. Material And Methods

Present study was carried out for a period of one year from March 2013 to February 2014 at Department of Haematology and Transfusion Medicine, SMHS (a tertiary care teaching hospital), Srinagar J&K, India. Total of 7022 blood donors were taken from in-house/ replacement at blood bank and outdoor blood donation camps (includes universities, colleges, corporate sectors, etc.).

Blood donors were selected after proper history and complete examination fulfilling all eligibility criteria's for blood donation.

Determination of ABO and Rh status was done by tile method of agglutination. Drop of blood was placed on clean white tile at 3 places in a row. A drop of commercially available Anti-A, Anti-B and Anti-D (monoclonal antisevas) were added respectively (by Tulip Diagnosis Ltd. India). On basis of agglutination of serum by respective anti-sera, blood groups were determined.

4. Results

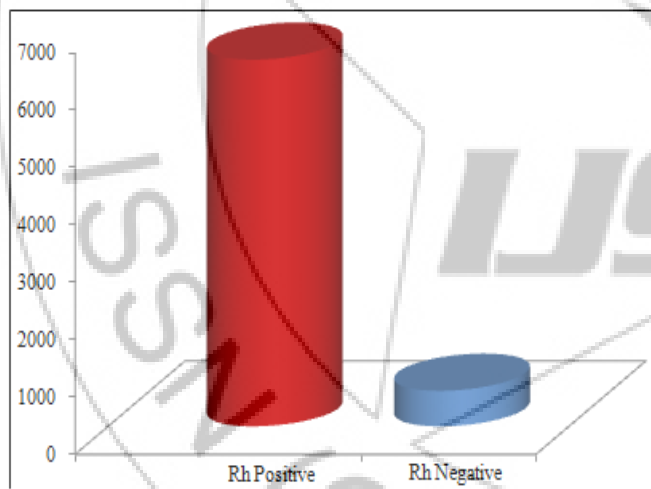
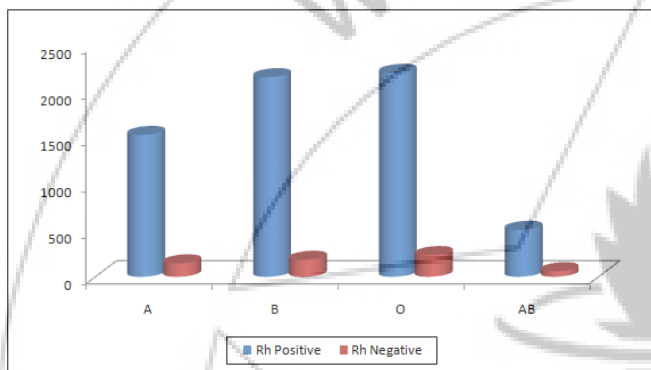
Frequency of ABO blood group in a total donor population of 7022 was compared (table 1). Group O was found to be most prevalent with 34.72% followed by B (33.34%), A

(23.88%) and least prevalent being AB (8.06%) (Fig. 1). On further analysis prevalence of Rh positive donors was found to be maximum with 91.17% while Rh negative donors make only 8.83% (Fig. 2). Trend of distribution being O negative (3.33%) > B negative (2.61%) > A negative (2.05%) > AB negative (0.84%).

O > B > A > AB i.e. 34.72% > 33.34% > 23.88% > 8.06%

Table 1: Distribution of ABO and Rh Blood Groups

Blood Group	Rh Positive	Rh Negative	Total
A (%age)	1533 (21.83%)	144 (2.05%)	1677 (23.88%)
B (%age)	2158 (30.73%)	183 (2.61%)	2341 (33.34%)
O (%age)	2204 (31.39%)	234 (3.33%)	2438 (34.72%)
AB (%age)	507 (7.22%)	59 (0.84%)	566 (8.06%)
TOTAL	6402 (91.17%)	620 (8.83%)	7022 (100%)



5. Discussion

The study under discussion has determined the distribution frequency of ABO and Rh blood group in blood donors in a tertiary care teaching hospitals. Our results states that in Kashmir valley blood group O is the commonest followed by a close second blood group B and AB happens to be the rarest. Also the Rh positive blood groups constitute 91.17% and Rh negative less common with frequency of only 8.83%. Among the negative blood groups O negative again was the commonest followed by B negative, A negative and AB negative was the rarest.

This study of frequency distribution of blood groups in donor population is very important for generation of simple database of blood groups to find out the easily available

ones and the blood groups which are difficult to procure and hence an important tool to determine the direction of recruitment of voluntary donors as required for each zone across the state. This information is useful in management of blood bank inventory and transfusion services to needy patients.

The distribution of ABO blood groups varies from one population to another. The comparison of frequency and distribution of ABO and Rh blood groups in blood donors at Kashmir (present study) with the similar studies carried out within and outside India is given in table (2) and table (3).

While looking at the table it can be read that our study was comparable to the studies done at southern India states like Vellore, Bangalore and Chittoor while in states like Punjab and Eastern Ahmedabad B happens to be most frequent blood group. In countries like Britain, USA and Niger delta blood group O is the most prevalent followed by blood group A.

Apart from transfusion services, knowledge of blood group systems helps to take preventive measures against the diseases which are associated with different blood groups as there is definite genetic association, like group O (non-secretory) has higher incidence of duodenal ulcer^{23,24,25} while group A carries increased incidence of gastric carcinoma²⁶. Likewise group B is found to be associated with ovarian carcinoma²⁷.

Table 2: Comparison of Present Study with Indian Studies (in percentage)

	A	B	AB	O	Rh +ve	Rh -ve
Present Study	23.88	33.34	8.06	34.72	91.17	8.83
Bangalore ¹²	23.85	29.95	6.37	39.82	94.2	5.79
Chittoor ¹³	18.95	25.79	7.89	47.37	90.6	8.42
Vellore ¹⁴	18.85	32.69	5.27	38.75	94.5	5.47
Shimoga-Malnad ¹⁵	24.27	29.43	7.13	39.17	94.93	5.07
Davanagere ¹⁶	26.15	29.85	7.24	36.76	94.8	5.52
Eastern Ahmedabad ¹⁷	23.3	35.5	8.8	32.5	94.2	5.8
Punjab ¹⁸	21.9	37.6	9.3	9.3	97.3	2.7

Table 3: Comparison with studies outside India

	A	B	AB	O	Rh	Rh -
Pakistan ¹⁹	23.85	38	10	10	89.1	10.9
Nepal ²⁰	34	29	4	33	96.7	3.33
Britain ²¹	41.7	8.6	3	46.7	83	17
USA ²²	41	9	4	46	85	5
Niger Delta ⁸	23.8	20.7	2.8	52.7	93.9	62.12

Thus present study concludes that blood group O is the commonest among the donor's followed by B, A and AB respectively. Rh +ve are more than Rh negative. The data generated in present study and similar studies in each region will be useful for health planners for drafting national transfusion policies and also serves to enable insight into possibilities of future burden of disease and make efforts to face further health challenges.

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