

Report

Distribution of ABO and Rh blood groups in Nepalese medical students: a report

T. Pramanik¹ and S. Pramanik²

SUMMARY The frequencies of ABO and rhesus blood groups vary from one population to another. We studied blood group distribution in 120 Nepalese students; 34% were blood group A, 29% group B, 4% group AB and 32.5% group O. The frequency of Rh-negative blood was 3.33% and Rh-positive 96.66%.

Introduction

To avoid the danger of a mismatched blood transfusion, it is important to determine the blood groups of those involved prior to a transfusion. These days, to eliminate the risks of a transfusion reaction, the practice of autologous transfusion is followed by most surgeons [1]. However, during emergencies where autologous transfusion is not possible, donor blood is matched with the recipient's before transfusion. The recipient's serum is combined on a glass slide with the prospective donor's erythrocytes, (a major cross-match), and the mixture observed for the rupture (haemolysis) or clumping (agglutination) of erythrocytes. In addition, the recipient's erythrocytes may be combined with the prospective donor's serum, (a minor cross-match) [2].

The membrane of a human red blood cell (RBC) contains a variety of blood group antigens. The most important and best known of these are A and B antigens,

which are actually complex oligosaccharides that differ in their terminal sugar. On RBCs they are mostly glycosphingolipids. The antibodies against red blood cell antigens are called agglutinins and individuals are divided into four major blood groups, A, B, AB and O, according to the presence of these antigens and agglutinins.

In addition, if human RBCs contain antigen D, the blood is known as rhesus (Rh) positive, while those persons without antigen D in their RBCs have blood that is rhesus negative. This D protein is not glycosylated and its function remains unknown [1].

It is interesting to note that the distribution of ABO and Rh blood groups varies from race to race. Among western Europeans, 42% have group A, 9% group B, 3% group AB and the remaining 46% group O. However, some eastern Europeans have a higher proportion, up to 40%, of group B blood. While pure native American Indians belong almost exclusively to blood group O

¹Department of Physiology; ²Department of Community Medicine, Nepal Medical College, Kathmandu, Nepal.

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[3], Americans generally have frequencies of A, B, AB and O blood groups of 41%, 10%, 4% and 45% respectively [1].

In the case of Rh groupings, existing literature indicates that 85% of Caucasians are Rh-positive and 15% Rh-negative. About 95% of African-Americans are Rh-positive, whereas indigenous Africans are virtually 100% Rh-positive [4]. Reports also indicate that although 85% of Caucasians are Rh-positive and 15% Rh-negative, over 99% of Asians are Rh-positive [1].

In view of these observations, we were interested in finding out the distribution of ABO and Rh groups among the students at our medical college. Although we have students from different countries of the South Asian Association for Regional Cooperation, we only examined the blood groups of Nepalese students.

Participants and methods

For the test, a drop of each of the antisera, anti A, anti B and anti D, (Orthodiagnostic Systems Incorporated, Raritan, New Jersey, United States of America) were placed on glass slides. Blood cells from each subject were mixed with each serum individually, with the help of separate glass rods. Blood groups were determined on the basis of agglutination as shown in Table 1.

If agglutination occurred with anti D, then the participant was Rh-positive; if not, he/she was Rh-negative.

Results

The frequencies of A, B, AB and O groups and Rh groups are shown in Table 2. The full distribution of blood groupings for both males and females is shown in Table 3.

Table 1 Blood group determination in Nepalese students

Reaction with anti A	Reaction with anti B	Blood group
+	+	AB
+	-	A
-	+	B
-	-	O

+ = agglutination
- = no agglutination

Table 2 Distribution of ABO and Rh blood groups among Nepalese students

Blood group	No. of students (n=120)	%
A	41	34.17
B	35	29.17
AB	5	4.17
O	39	32.50
Rh-positive	116	96.67
Rh-negative	4	3.33

Discussion

While current literature indicates that over 99% of Asians are Rh-positive, our students were 96.66% Rh-positive and 3.33% Rh-negative (Table 2). The distribution of A, B, AB and O groups among western Europeans has been reported as 42%, 9%, 3% and 46% respectively, but our students were about 34% blood group A, 29% group B, 4% group AB and 32.5% group O. There were some differences in the distribution of blood groupings between male and female students (Table 3).

Table 3 Combined distribution of ABO and Rh blood groups

Blood group	Total students (n = 120)		Male students (n = 64)		Female students (n = 56)	
	No.	%	No.	%	No.	%
A Rh-positive	38	31.67	19	29.69	19	33.93
A Rh-negative	3	2.50	3	4.69	0	0.00
B Rh-positive	34	28.33	19	29.69	15	26.78
B Rh-negative	1	0.83	1	1.56	0	0.00
AB Rh-positive	5	4.17	2	3.12	3	5.35
AB Rh-negative	0	0.00	0	0.00	0	0.00
O Rh-positive	38	31.67	20	31.25	18	32.14
O Rh-negative	1	0.83	0	0.00	1	1.78

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