

Pattern of Abo & Rh Blood Groups in Multan Region

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The discovery of various blood group systems has an immense importance in transfusion medicine and medico legal field. The association of certain blood groups with various diseases like peptic ulcer is well established. ABO and Rh blood groups are the main systems to cause blood transfusion reactions. An individual blood group today, is as important as national identity card. In cases of emergency blood transfusion, the blood group data of a population is very much important. The frequency of ABO and Rh blood groups vary throughout the world. It has been observed that group B diminishes in frequency from East to West. ABO and Rh blood group data is well established in Karachi and Lahore areas, but the data is not available from Multan region. In this study six thousands young healthy voluntary blood donors of either sex belonging to Multan region comprising of 5476 males and 524 females were included from "Blood Transfusion Center Nishtar Hospital Multan" and "Fatmid Blood Transfusion Center Multan". The commonest blood group observed in this study was "B" with frequency of 36.95%. The next common was group "O" with frequency of 33.8% followed by group "A" with frequency of 21.92% and group "AB" 7.33%. The frequency distribution of Rh blood group shows that 92.17% of the subjects are Rh+ve & 7.83% are Rh--ve.

Keywords: Blood Groups, ABO, Rh (D), Frequency, Multan.

The discovery of various blood group systems and the presence of blood group antigens on different cells of the body tissues have immense importance in transfusion medicine, genetics, medical jurisprudence, infertility problems in gynaecology, anthropology, haemolytic disease of the newborn (HDN), organ transplantation, oncology and association of different diseases with blood groups in medicine.

When blood transfusions from one person to another were first attempted, the transfusions were successful in some instances, but in many more, immediate or delayed agglutination and hemolysis of the red blood cells occurred. Soon it was discovered that the blood of different persons usually have different antigenic and immune properties, so that antibodies in the plasma of one blood react with antigens on the surfaces of the red cells of another. Two particular groups of antigens are more likely than the others to cause blood transfusion reactions. These are ABO system of antigens and the Rh system. Frequencies of ABO & Rh blood groups vary throughout the world^{1,2,3,4} as shown in tables 1 & 2. It has been observed that group B diminishes in frequency from East to West⁵.

Table-1 Frequency of ABO Phenotypes in selected populations

Population	A	B	AB	O
European-American	45%	8%	4%	43%
African-American	29%	17%	4%	50%
German	42%	11%	4.2%	42.8%
South American	0%	0%	0%	100%
Indian				
Australian Aborigine	55.6%	0%	0%	44.4%

Table-2 Frequency of Rh Blood Groups in selected population

Population	Rh positive	Rh negative
Caucasoid	85%	15%
American blacks	95%	5%
African blacks	100%	0%
British	83%	17%
Asian	99%	1%

ABO blood group data is well established in Karachi⁶ and Lahore^{7,8} areas, but data is not available for Multan population. The purpose of this study is to determine the pattern of ABO and Rh blood groups in Multan region. The results of this study will be of immense help in the future as we will know which blood group is in greater demand and donation for those particular

groups may be requested accordingly. Similarly blood donor societies will get benefit from the results of this study as regards their priority of getting donations and storage of various blood groups. Moreover this data will be helpful to study the prevalence of Hepatitis B, Hepatitis C and HIV infections among the donors, in this region.

Subjects and methods: In this study six thousand young healthy voluntary blood donors of either sex belonging to Multan region were included from "Blood Transfusion Center Nishtar Hospital Multan" and "Fatmid Blood Transfusion Center Multan." The clinical details of these subjects were recorded on a proforma. The blood samples were collected by venepuncture using sterile disposable syringes.

For ABO blood grouping the slide method⁹ was used. One drop of anti-B serum (Trans clone "R" anti-B Sanofi diagnostic, Pasteur) was placed on the left side of the glass slide and one drop of anti-A serum (Trans clone "R" Anti-A Sanofi diagnostic, Pasteur) on the right side. One drop of unknown cell suspension was mixed with each of these antisera and the slide was tilted back and forth for 3 to 5 minutes. The drops were then covered with cover glasses to facilitate examination under the microscope. Agglutination was observed within 2 to 5 minutes and the results were read as in the table 3.

Table 3:

Anti-sera in which agglutination occurred	Blood group
Anti-sera "A"	A
Anti-sera "B"	B
Both Anti-sera "A" & "B"	AB
None	O

For Rh blood typing the method used was as mentioned by Dacie and Lewis¹⁰. As described in slide method for ABO grouping, one drop of unknown blood mixture was mixed with one drop of anti-D reagent (Trans clone R anti-D Fast M, Sanofi diagnostic Pasteur) on the slide and it was tilted back and forth for 3 to 5 minutes. The drop was covered with cover glass and seen under microscope. The results were taken as Rh positive if agglutination occurred because anti-D reagent agglutinates D antigen containing RBCs.

Fresh serum samples were tested for the presence of hepatitis B surface antigen by commercially available kit (Surase B-96 (OPD) GENERAL BIOLOGICALS HbsAg EIA). The

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procedure was strictly followed as given in the kit. Negative and positive controls were run with each batch of samples.

Anti-HCV antibodies were tested by commercially available kit (GBC ANTI- HCV RAPID TESTS, GENERAL BIOLOGICAL CORP).

Anti-HIV antibodies were tested by commercially available kit (HIVASE 1+2--96 GENERAL BIOLOGICALS ANTI-HIV 1+2 EIA).

Results:

A group of 6000 young healthy voluntary blood donors comprising of 5476 males and 524 females were tested for ABO and Rh blood groups. The frequency distribution of ABO blood groups. It shows that Group B (36.95%) is the commonest followed by Group O (33.8%), and Group A (21.92%). Group AB (7.33%) is the least common.

There was statistically no significant difference in the frequency of ABO blood groups between the two sexes (Table 4).

The frequency distribution of Rh-antigen shows that 92.17% of the subjects are Rh-positive and 7.83% are Rh-negative. There was also statistically no difference in Rh-antigen expression between male and female sexes (Table 5).

The expression of Rh-antigen frequency in each ABO group is shown in the table 6. Out of 6000 healthy voluntary blood donors, 202 were HBsAg positive. Thus the prevalence rate for HBsAg carrier state was 3.37%. All 6000 subjects were tested for Anti HCV antibodies and 16 were positive. So the positivity rate of Anti HCV was 0.27%. None out of 6000 subjects was positive for Anti HIV antibodies.

Table 4: Frequency of ABO blood groups in both sexes

Blood Groups	B	O	A	AB
Males (n=5476)	36.99%	33.88%	21.82%	7.30%
Females (n=524)	36.45%	33.02%	22.90%	7.63%

Table 5. Frequency of Rh-antigen expression between male and female

Rh-antigen status	Rh-positive	Rh-negative
Males (n=5476)	92.13%	7.87%
Females (n=524)	92.56%	7.44%

Table 6. The expression of Rh-antigen frequency in each ABO group

Variables	Rh-positive	Rh-negative
A(n=1315)	91.63%	8.37%
B(n=2217)	93.10%	6.90%
O (n=2028)	91.72%	8.28%
AB(n=440)	91.14%	8.86%

Discussion:

The blood group systems are important in transfusion medicine, genetics, and medical jurisprudence, infertility problems in gynecology, anthropology, and hemolytic disease of the newborn (HDN), organ transplantation and oncology. In the medico-legal field blood groups are used for establishing paternity and for other identification purposes. Anthropologists have used the blood group system to study the origin of races and movement of population through the centuries. An association of given blood group with environmental diseases may tell about the genetic pressures which favor the survival of certain populations. The association of given blood groups with various diseases like peptic ulcers, malaria, HBsAg carrier state and carcinoma of stomach is also well established.

An individual blood group today, is as important as the national identity card. The obvious reason is the blood transfusion in cases of emergency. In medicine the life saving procedure of blood transfusion only becomes possible after the identification of the various blood group systems. The incompatibility of ABO and Rh blood groups between mother and baby is responsible for jaundice, kernicterus and death in the newborn (HDN). Blood group data of a population is also important from a laboratory viewpoint, since it guides blood banks about the number and types of blood to be stored for transfusion services in cases of various catastrophes.

There is a worldwide variation in distribution of ABO and Rh blood groups. The commonest group observed in this study was "B" with frequency of 36.95%. Next common was group "O" with frequency of 33.8%, followed by group "A" with frequency of 21.92%, and group "AB" 7.33%. ABO blood group data is well established in Pakistan and neighboring countries.

The results of this study were similar to the study done in Lahore⁸ in 1996 and in Punjab¹¹ in 1977. There was a slight difference from other two studies done in Karachi⁶, Lahore⁷ and Hyderabad¹⁵ but this was not statistically significant. The group "O" was the commonest in one study done in Lahore⁷. This difference of frequency in group "O" might be due to difference in sample size or geographical variation.

The frequency of Rh blood group in this study was Rh +ve 92.17% and Rh -ve 7.83%. The results of this study are comparable to other studies done in this region.

Moreover there was statistically no difference between the ABO and Rh blood group frequency in both sexes.

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