FREQUENCY OF ABO AND RH (D) BLOOD GROUPS AMONG BLOOD DONORS IN RAWALPINDI/ISLAMABAD AREA

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ABSTRACT

Objective: To determine the frequency of various ABO and Rh (D) blood groups among the blood donors in Rawalpindi/Islamabad area of Pakistan.

Study design: Cross sectional descriptive study.

Materials and Methods: Armed Forces Institute of Transfusion (AFIT), Rawapindi from Sep 2010 to Jan 2011. A total of 4642 healthy adult, blood donors (volunteer and directed both) belonging to Rawalpindi/Islamabad region were included. From each donor 2 ml of EDTA blood was taken. ABO and Rh (D) blood grouping were carried out by tube method using commercially prepared antisera. The frequency of each type was calculated.

Results: Among ABO blood groups the most frequent was B with 1593 subjects (34.3%), followed by O with 1454 (31.3%), A with 1124 (24.2%), and AB with 471 (10.1%) individuals. The Rh (D) positive were 4226 subjects (91%) and Rh (D) negative were 416 (9%). Among Rh (D) positive cases, blood group B was most frequent with 1476 (34.9%) individuals, however among Rh (D) negative individuals the most frequent blood group was O with 149 individuals (35.8%).

Conclusion: 'B' was most frequent among the ABO blood groups. Knowledge of prevalence of various blood groups in the area will help in managing the transfusion services.

Keywords: ABO blood group, AFIT, Rawalpindi, Rh (D) blood group, Transfusion.

INTRODUCTION

Blood is the most important body fluid, which is responsible for circulation of important nutrients, enzymes, and hormones all across the body, besides the most critical substance, oxygen. Red blood cells contain a series of glycoproteins and glycolipids on their surface which constitute the blood group antigens. Production of these antigens is genetically controlled. Although almost 400 blood grouping antigens have been reported, the ABO and Rh are recognized as the major (clinically significant) blood group antigens. This system derives its importance from the fact that A and B are strongly antigenic and anti-A and anti-B occur naturally in the serum of persons lacking the corresponding antigen, these antibodies being capable of producing haemolysis in vivo[1]. ABO system consists of four main groups, AB, A, B and O which are determined on the basis of presence or absence of A and B antigens. The Rh antigens commonly recognized on the red cell include D, C, c, E and e[2].

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Received: 13 Jul 2011; Accepted: 30 Jan 2012

1901 represents the most important year in the history of blood transfusion through the discovery of the ABO blood groups by Karl Landsteiner. Forty years later, both Landsteiner and Wiener discovered Rh (D) antigen[3,4]. The genes of ABO and Rh (D) are located on chromosome 9 and 1 respectively. Together these systems have proved to be the most important, for blood transfusion purposes.

ABO blood grouping is the single most important test performed in blood banking to avoid morbidity and mortality[5]. Rh antigen emerged as second most important blood group system due to hemolytic disease of newborn and its importance in Rh (D) negative individuals in subsequent transfusions once they develop Rh antibodies[6]. Blood group antigens are not only important in relation to blood transfusion and organ transplantation, but also have been utilized in genetic research, like many of the diseases have association with certain blood groups[7].

The aim of this study was to record the various blood groups among the donors of Rawalpindi and Islamabad region, Pakistan, with a view to generate data with multipurpose

future utilities for the health planners and also see the common trend of the prevalence of various blood groups.

MATERIAL AND METHOD

This cross sectional descriptive study was conducted at the Armed Forces Institute of Transfusion Rawalpindi, from Sep 2010 to Jan 2011. A total number of 4642 healthy, adult donors, volunteer as well as directed belonging to Rawalpindi and Islamabad region, between the ages 18-60 yrs were included. A 2ml sample of blood was drawn from the antecubital vein of each donor in a disposable syringe, and transferred immediately to a tube containing ethylene diamine tetra acetic acid (EDTA).

ABO and Rh (D) blood grouping was done by tube method (direct and reverse both types) using ABO Antisera and Rhesus monoclonal Antisera of Biolaboratories. The data was compiled and then analyzed for frequency of ABO and Rh (D) blood grouping by using SPSS 18.

RESULTS

Descriptive statistics were used to describe the data. A total of 4642 individuals were included. Age range was 21 to 30 years with 99.4% males and 0.6% females.

Table-1 shows the frequency of ABO and Rh (D) blood grouping of the studied population.

DISCUSSION

The need for blood group prevalence study is not only important for transfusion medicine but also for organ transplantation and genetic research. The frequency of ABO and

Table-1: Frequency distribution of ABO and Rh (D) blood groups

	A %	B %	O %	AB %	TOTAL %
Rh D(+)	1017 (24.1%)	1476 (34.9)	1305(30.9%)	428 (10.1)	4226 (91%)
Rh D(-)	107 (25.7)	117 (28.1)	149 (35.8%)	43 (10.3)	416 (9%)9
TOTAL	1124 (24.2)	593 (34.3)	1454 (31.3%)	471 (10.1)	4642 (100%)

Table-2 Comparison of frequency (%) of ABO and Rh (D) blood groups in different regions of Pakistan

Ser	Region	A	B	O	AB	RhD (+)	RhD (-)	comments
1	**Rwp/Isbd (AFIT)**	24.2	34.3	31.3	10.1	91	8.9	B>O>A>AB
2	**Skardu**[9]	30.62	26.80	26.60	15.98	94.83	5.17	A>B>O>AB
3	**Swat**[10]	27.92	32.40	29.10	10.58	90.00	10.00	B>O>A>AB
4	**Multan**[11]	21.92	36.95	33.8	7.33	92.17	7.83	B>O>A>AB
5	**Rwp/Isb**[8]	27.01	33.75	30.31	8.93	92.45	7.55	B>O>A>AB
6	**Punjab**[12]	21.20	36.16	34.14	9.05	97.24	2.76	B>O>A>AB
7	**Sindh**[12]	24.90	31.80	35.50	6.90	91.30	8.70	O>B>A>AB
8	**Pakhtuns**[12]	24.30	31.40	35.40	8.80	92.30	7.70	O>B>A>AB
9	**Baluchistan**[12]	23.30	27.90	40.90	7.80	92.20	7.80	O>B>A>AB
10	**Gilgit**[13]	24.2	40	25.8	10	89.8	10.2	B>O>A>AB

Table-3 Comparison of frequency (%) of ABO and Rh (D) blood groups in different countries of the world

Ser	Country	A	B	O	AB	RhD (+)	RhD (-)	comments
1	**USA**[14]	40.0	11.00	45.00	4.00	83.00	17.00	O>A>B>AB
2	**Canada**[15]	42.0	9.0	46.0	3.0	85.1	14.9	O>A>B>AB
3	**Britain**[16]	41.70	8.60	46.70	3.00			O>A>B>AB
4	**Turkey**[17]	27.0	30.6	30.4	12.0	85.9	14.1	B>O>A>AB
5	**India**[18]	23.85	29.95	39.81	6.37	94.20	5.79	O>B>A>AB
6	**Bangladesh**[19]	26.6	23.2	40.6	9.6	96.8	3.2	O>A>B>AB
7	**Nepal**[20]	34.00	29.00	32.50	4.00	96.66	3.33	A>O>B>AB
8	**Saudi Arab**[21]	24.00	17.00	52.00	4.00	93.00	7.00	O>A>B>AB

Rh(D) blood groups varies in different population throughout the world. In Pakistan multiple studies have been done in different regions depicting the prevalent groups in the respective areas. The relative frequency of the various blood groups, does not seem to deviate from those done earlier from segments of the Pakistani population. The results obtained in the present study are similar with the results obtained by Khan for a study conducted on population of Rawalpindi and Islamabad in 2004, in which the most prevalent blood group was B (33.3%) , followed by, O (31.1%) and A (25.53%) and AB (10.04%)[8]. Analyzing the different studies in Pakistan it is evident that common blood groups in many regions of Punjab and Khyber Pakhtunkhwa are B>O>A>AB, while in Sindh and Balochistan the order of prevalence is O>B>A>AB[8-12]. In contrast, the commonest blood group in Skardu region[9] is A, followed by B,O and AB. Rh (D) positive remain the predominant throughout Pakistan with prevalence around 90% in all the studies[8-12].

International studies have shown wide variation of blood groups in different populations. In USA[13] and Britain[14] Caucasians the commonest blood group is O, followed by A, B and than AB. In India the most prevalent blood group is O, followed by B, A and AB[15]. The order of prevalence of ABO blood group in Bangladesh is O>A>B>AB[16]. Blood group A is commonest in Nepal followed by O, B and AB[17]. Most frequently encountered blood group in Saudi Arabia is O, followed by A, B, and AB[18]. The blood group AB remains the least frequent blood group throughout the world. In terms of presence of Rh antibodies the global trend of Rh (D) positive remains very high as compare to Rh (D) negative. Summary of various regional and international studies on the subjects is given in table 2 and 3.

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