

FREQUENCY OF ABO AND Rh BLOOD GROUP AMONG THE HEALTHY BLOOD DONORS, A SINGLE CENTRE STUDY

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ABSTRACT

Objective: To determine the frequency of ABO and Rh blood groups among the healthy blood donors.

Study Design: Cross sectional study.

Place and Duration of study: This was carried out at Pakistan Air Force (PAF) Hospital Islamabad from January 2015 to April 2017.

Materials and Methods: The blood donors were recruited from Islamabad and surroundings. A detailed medical history and examination was carried out by medical officer. All donors were provided questionnaire and consent Proforma. The blood donors negative for previous history of viral hepatitis and other contraindications for blood donation were included in study. Blood group of each donor was confirmed by using ABO Antisera and Rhesus monoclonal Antisera of Biolaboratories by tube method.

Results: A total of 2185 healthy blood donors were enrolled. Male were predominant population among the blood donors with a ratio of 45:1. Majority of the blood donors were in the third decade of their life. The most common ABO blood group was B whereas Rh positive was most common among Rh blood group system.

Conclusion: The blood group B was most frequent blood group among the healthy blood donors. Whereas, AB was found to be least frequent. Among the Rh blood group system, Rh positive was found to be more frequent as compared to Rh negative.

Keywords: Blood donors, ABO, Rh, Blood group.

This article can be cited as: Sadiq MA, Yousuf R, Hussain A, Bilal A. Frequency of ABO and Rh blood group among the healthy blood donors, a single centre study. Pak J Pathol. 2017; 28(4): 155-157.

INTRODUCTION

The first blood group system discovered in humans was ABO blood group system. It was in 1900 when Karl Landsteiner put forward ABO blood group system [1,2]. Different types of polysaccharide antigens, called agglutinogens are present over red cell membrane. This agglutininogen has the capability to generate an immune response resulting in production of antibodies [3]. 308 red cell surface antigens have been recognized by The International Society of Blood Transfusion, out of which 270 belong to one of 30 blood group systems. The clinical importance of ABO blood group system is related to frequency of its antibodies production and their capability to destroy incompatible red cell in vivo. All humans above the age of 6 months have significant Anti A and Anti B antibodies in their serum in adequate quantities.

The Rh blood group system is second most important blood group system related to transfusion. However, it is fourth to be discovered, approximately 40 years after the discovery of ABO system, by

Landsteiner and Wiener [4]. The Rh blood group system antigens over red blood cell are D, C, c, E and e. The importance of Rh blood group system is due to hemolytic disease of newborn and in subsequent transfusion in Rh (D) negative individuals having Rh antibodies [5]. The blood group prevalence studies carry multiple advantages such as their relation with blood transfusion, disease, organ transplantation, genetic research and anthropology [6].

MATERIALS AND METHODS

This cross-sectional study was carried out at pathology department of PAF Hospital Islamabad from January 2015 to April 2017. The blood donors were adult, volunteer and directed donors were recruited only. Their ages were between the 21 and 48 years. Selection criteria employed at PAF hospital Islamabad is weight greater than 50kg, age between 18 and 60 years, for females haemoglobin more than 12g/dl and for males haemoglobin more than 13g/dl. A detailed medical history and examination was carried out by medical officer. All donors were provided questionnaire and consent proforma. The blood donors negative for previous history of viral hepatitis and other contraindications for blood donation were included in study. Blood group of each

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Received: 15 June 2017; Revised: 26 Sep 2017; Accepted: 22 Oct 2017

donor was confirmed by using ABO Antisera and Rhesus Monoclonal Antisera of Biolaboratories by tube method. Their complete blood counts were measured on Sysmex KX 32 hematology analyzer. The data was analyzed using Statistical Package for Social Sciences (SPSS) software version 17.

RESULTS

A total of 2185 healthy blood donor were enrolled. Male were predominant population among

probability evaluation and resolving disputed paternity/maternity [14].

The present study showed large number of male donors as compared to female donors. Although more than 50% population of Pakistan comprises of female but female donors in our study as well as other studies conducted in different regions of Pakistan are low. Moreover, factors involving low recruitment of female donors include anaemia, low weight, pregnancy, lactation and poor diet of females.

Table-1: Table showing the frequency of ABO and Rh blood group among blood donors.

Blood group	A (%)	B (%)	O (%)	AB (%)	Total (%)
Rh Positive	529 (24.21%)	649 (29.7%)	656 (30.02%)	168 (7.68%)	2002 (91.62%)
Rh Negative	44 (2.01%)	66 (3.02%)	51 (2.33%)	22 (1.0%)	183 (8.38%)
Total	573 (26.22%)	715 (32.72%)	707 (32.35%)	190 (8.69%)	2185 (100%)

Table-2: Table showing comparison of our study with studies from different regions of Pakistan.

Study Population	A (%)	B (%)	O (%)	AB (%)	Rh Positive (%)	Rh Positive (%)	Frequency
Rwp/lsh ⁷	24.2	34.3	31.3	10.1	91	8.9	B>O>A>AB
Lahore ⁸	20.4	38.2	33	8.4	95.8	4.2	B>O>A>AB
Swat ⁹	27.92	32.4	29.1	10.58	90	10	B>O>A>AB
Sind ¹⁰	24.9	31.8	35.5	6.9	91.3	8.7	O>B>A>AB
Balouchistan ¹¹	23.3	27.9	40.9	7.8	92.2	7.8	O>B>A>AB
Gilgit ¹²	24.2	40	25.6	10	89.8	10.2	B>O>A>AB
Skardu ¹³	30.62	26.8	26.6	15.98	94.83	5.17	A>B>O>AB
lsh (our study)	26.22	32.72	32.35	8.69	91.62	8.38	B>O>A>AB

the blood donors with a ratio of 45:1. Majority of the blood donors are in third decade of their life. The most common ABO blood group was B whereas Rh positive was most common among Rh blood group system (Table-1).

DISCUSSION

The present study is useful in providing information regarding ABO and Rh blood group status in Islamabad region of Pakistan. The blood group systems have been extensively studied throughout the world. The diversity in the blood groups among the human populations is related to multiple factors such as migration, genetic drift, random effects and allele selection. There is a wide variation of ABO and Rh genes and phenotypes across races and geographical boundaries irrespective of the fact that the antigens involved are stable throughout life. As a result, polymorphism has important implications over population such as genetic studies, compatible blood availability estimation, haemolytic disease of the new born

In present study the most frequent ABO blood group was B. Our finding is similar to study conducted by Shakir et al [7] in same region in 2012. Blood group B was also found to most frequent blood group in studies conducted in Lahore, Swat and Gilgit by Nasim et al [8], Khattak et al [9] and Ali et al [12] respectively. Whereas, in studies conducted at Sind and Balouchistan by Mehmood et al [10] and Islam et al [11] blood group O was found to be most frequent. Blood group A was most frequent blood group reported by Alam et al [13].

The least common blood group in our study was AB. This finding is similar to all other studies carried out in Islamabad and other regions of Pakistan (Table-2). The overall frequency in order of prevalence in our study was B>O>A>AB. This is similar to order of prevalence reported by Nasim et al [8], Shakir et al [7], Khattak et al [9] and Ali et al [12] O>B>A>AB is the ABO prevalence reported by Mehmood et al [10] and Islam et al [11].

Blood group A is the third most frequent blood group in our as well as all other studies in different

region of Pakistan except study conducted by Alam et al [13] (Table-2). Among the Rh blood group system Rh positive was found to be more frequent (91.62%). This finding is similar to all other studies conducted in Pakistan.

The information regarding the prevalence of blood groups is important in maintaining the blood bank inventories and transfusion services. It also aids in recruitment of blood donors according to the specific blood group transfusion demands. Apart from this, studies have also shown possible relation of diseases with certain blood groups such as association of cardiovascular diseases in individuals having blood group A. Similarly, gastric carcinoma is more common in individuals having blood group A. Females having blood group B have increased chances of ovarian cancer. Blood group also poses reduced risk to certain diseases such as reduced risk of pancreatic cancer, squamous cell and basal cell carcinoma in blood group O individuals [15-19].

CONCLUSION

The blood group B was most frequent blood group among the healthy blood donors. Whereas, AB was found to be least frequent. Among the Rh blood group system, Rh positive was found to be more frequent as compared to Rh negative.

AUTHORS CONTRIBUTION

Muhammad Arif Sadiq: Concept and overall supervision, manuscript writing

Rizwan Yousuf: Data collection and tabulation

Asma Bilal: Data collection and literature review

Amir Hussain: Data analysis and interpretation

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