

FREQUENCY OF VARIOUS RH ANTIGENS IN BASRAH PROVINCE, IRAQ

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ABSTRACT

Knowledge of the frequencies and the phenotype of Rhesus system is very important for Blood Bank and transfusion service policies. This study was conducted on 2875 blood samples from Blood Bank in Teaching Hospital in Basrah to study different Rh phenotype in blood donors. The result showed that the frequency of Rh positive was found to be (93.1%) and Rh negative was (6.99%). The Rh phenotypes in 87 Rh negative blood samples present in decreasing order of frequency were as follows: rr, r¹r, r¹¹r, r¹r¹¹, r¹r¹, r¹¹r¹¹, r^y. The results of this study were compared with the results of other studies.

INTRODUCTION

The presence of Rhesus antigen was discovered in 1939 by Levine following injection of human erythrocytes in Rhesus monkeys. The monkeys produced specific antibodies which agglutinated the red cells of 85% of ABO compatible donors.^[1] The Rhesus system is much more complex than the ABO system; at the present time the Rh blood group system is composed of over 50 different specificities. The expression of Rh factor is controlled by 2 closely linked genes on chromosome one; one gene codes for D and the other gene for CcEe.^[2,3] The D-antigen, which is the most immunogenic red cell antigen after A and B and is the most important in transfusion medicine, since anti D formation usually results from exposure through either pregnancy or transfusion of red cells possessing the D-antigen to person who lack this antigen.^[4] Interestingly, both ABO and Rhesus blood groups exhibit extensive polymorphism in different population and the frequency at which each of the blood group exists shows considerable variation in different population.^[5] Knowledge of Rh phenotypes in given population is relevant for better planning and management of Blood Banks.^[6] Patients needing multiple blood transfusion like those with sickle cell disease, thalassemias, etc, are not few in our region, they may develop allo-antibodies against Rh antigens. To find compatible blood for such patients, we need to know Rh phenotypes of the donors and recipients. This study was carried

out with specific aim to determine the frequency of Rhesus phenotype in Basrah and to compare the results of this study with those of other studies.

MATERIALS AND METHODS

All ABO and Rh serological results obtained in the Blood Bank Department of Teaching Hospital in Basrah from October 2001 to July 2002 were retrospectively reviewed and analyzed. During this period a total of 2875 potentially healthy donors (2335 male and 540 female) donating blood for various reasons were evaluated for the ABO and Rh factor. Only Iraqi nationals were included in this study. The ABO and Rh groups were determined by seraclone, clone A003 (IgM) kit (Bio test AG), kit No. 186242/11, West Germany. A total of 87 Rh (D negative) blood sample were phenotyped for Rh antigens, each sample was tested for C,c, E,e antigens by using monoclonal antisera anti C, anti c, anti E and anti e from Bio test (using the slide method), kit No. 186670/09. This is the only available Kit.

RESULTS

Frequency of Rh positive/Rh negative phenotype:

Two thousand six hundred and seventy four out of 2875 donors were Rh positive, representing {93.01%} While 201 out of 2875 donors were Rh negative representing (6.99%) (Table-1).

Table 1. *Frequency of Rh positive/negative in Basrah (Iraq) comparison with other studies.*

Nationality	Sample size	Rh(D+ve)		Rh(D-ve)	
		No.	%	No.	%
Present study	2875	2674	(93.01)	201	(6.99)
Basrah (1999)	2488	2245	(90.23)	243	(9.77)
Basrah (1985)	4324	4032	(93.25)	292	(6.75)
Baghdad	210	183	(87.00)	27	(12.8)
Saudi Arabia	52861	52861	(92.00)	4535	(8)
Bahrain	-	-	(91.80)	-	(8.2)
Kuwaitis	2328	2154	(92.50)	174	(7.5)
Pakistans	1039	995	(96.00)	44	(4)
Chinese	-	-	(99.00)	-	(0.06)
European	-	-	(85.00)	-	-
Asian	-	-	(98.00)	-	-

+ve: positive, -ve: negative, N: number, Rh: Rhesus

Frequency of Rh phenotypes:

Among 87 Rh negative blood sample, the distribution of various Rh phenotypes is shown in (Table-2) seven different phenotypes were found in this study the most frequent was ce (79.3%), the genotype frequency was based on the most probable genotype for a given phenotype.

ABO distribution among Rh positive/negative phenotype:

Group O was the commonest in both Rh positive and Rh negative representing 38.89% and 37.81% respectively.

Groups A, B and AB occurred in a frequency of 23.04%, 30.74%, 7.33% in Rh positive blood and 19.4%, 31.84%, 10.95% in Rh negative blood respectively.

Table 2. *Frequency of Rh phenotype in Basrah [Iraq] comparison with other studies.*

Phenotype	Most common genotype	Present study 2002		Baghdad Adil 2001		Saudi (Al-Sheikh) 1997	
		No.	%	No.	%	No.	%
ce	rr	69	(79.31)	24	(88.89)	581	(89.25)
Cce	r ¹ r	6	(6.89)	3	(11.11)	58	(8.91)
cEe	r ¹¹ r	5	(5.75)	-	-	8	(1.23)
CcEe	r ¹ r ¹¹	3	(3.45)	-	-	4	(0.61)
Cc	r ¹ r ¹	2	(2.30)	-	-	-	-
cE	r ¹¹ r ¹¹	1	(1.15)	-	-	-	-
CE	r ^y	1	(1.15)	-	-	-	-
Total (Rh (D-ve))		87	(100%)	27	(100%)	651	(100%)

DISCUSSION

This study has determined the distribution and frequency of Rhesus blood group and Rhesus phenotype in Basrah donors. Only a limited number of other studies are available for comparison in Iraq. One report on demographic

data in Basrah, obstetric patients showed the frequency of Rh (D+ve) as (93.25%)^[7], which is similar to this study. Another Iraqi study in Basrah again on obstetric patients the frequency of Rh (+ve) and Rh (-ve) was 90.23% and

(9.77%)^[8] respectively. Even though these data for the frequency of Rh +ve and -ve came from female subjects only, male do not expect to have a different pattern, this is due to the fact that blood group are autosomal and the frequencies are not different in the two sexes. In one study in Baghdad (Iraq) the frequency of Rh +ve and Rh -ve were 87% and 12.8% respectively but the number studied was smaller than the present study, 210 subjects only.^[9] In this study it was found to be similar to several studies in Saudi Arabia, that the incidence of Rh (-ve) is approximately 6-9%, which is much less compared to western countries.^[6,10-14] Thus the number of cases of hemolytic disease of the newborn (HDN) are expected to be much lower. Similar observations have been reported in Asians (especially Chinese). Blacks in the USA and Africa have a level of 8% and 4% respectively while Basque population have the highest incidence of Rh (-ve) (30-35%), English (17%) and in Europe (15%).^[10,15-17] Regarding Rh phenotype in Rh negative subjects, the most commonly seen in this study was ce (rr) which is similar to that reported in studies conducted in Iraq, Saudia, Kuwait and West,^[6,9] While the phenotype CEe (r¹¹r) was more common in this study than was found in Saudia and no such phenotype in previous Iraqi study. This probably reflects the change in the character of population during the past years such as immigration, Wars and marriage to foreigners.

Conclusion, in this study in Basrah region, the Rh positive was found to be (93.01%) and Rh negative was (6.99%). The Rh negative phenotypes present in decreasing order of frequency were as follows: rr, r¹r, r¹¹r, r¹r¹¹, r¹r¹, r¹¹r¹¹, r^y. Further studies to delineate Rh positive phenotype and genotype nature using complex antibodies and direct DNA analysis are needed.

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