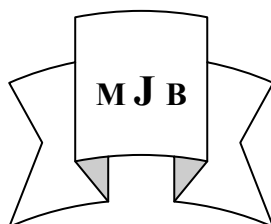


Frequency Distribution of ABO Blood Groups and Rh Governorate-Iraq Phenotypes of Blood Donors in babylon

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Abstract

A study had been carried out to determine the distribution of ABO and Rh phenotypes in the population of Babylon Governorate. The study group included a total of 7317 donors, who were registered in the central blood banks at Al-Hilla General Teaching hospital during the period (February 2007 to May 2007). 7184(98.2%) were males and 133(1.8%) were females.

The highest prevalence was that of blood group O (35.5 %) followed by blood groups A and B (27.7% and 28.3 % respectively) and the lowest of blood group AB (8.3%). The Rh phenotypes distribution also varies among the ABO blood groups. The total percentage of Rh positive was 90.1% and that of Rh negative was found to be 9.9%. The current study provides the estimation of the distribution of the proportion of ABO blood groups and Rh for the population of Babylon governorate.

الخلاصة

أجريت هذه الدراسة لمعرفة أنواع فصائل الدم الأكثر شيوعاً لدى المتبرعين بالدم من سكان محافظة بابل. شملت الدراسة 7317 متبرع دم مسجلين في مصرف الدم المركزي في مستشفى الحلة التعليمي العام خلال الفترة (من شباط 2007 وحتى مايس 2007) ومن خلال الدراسة تبين 7184 ذكورا و 133 إناثا وان فصيلة الدم (O) أكثر شيوعا (35.8%) تليها فصيلة B (28.3%) A, (27.7%) والمتقارب في النسب في حين فصيلة الدم (AB) اقل شيوعا (8.3%) وان (Rh. +ve) 90.1% و (Rh. -ve) 9.9%. أعطت هذه الدراسة تخميناً لنسب توزيع فصائل الدم والريس لمجتمع محافظة بابل.

Introduction

The ABO and Rhesus blood groups system were discovered and identified by Karl Landsteiner in 1900 and 1940 respectively[1]. Before the 1900s, it was thought that all blood was the same. In general the distribution of the four ABO blood types, A, B, AB, and O, varies in populations throughout the world. The ABO system remains by far the most significant for transfusion. The ABO blood group system is the only system in which antibodies are consistently and predictably present in

the serum of normal individuals whose red cells lack the antigens[15].

In an emergency, anyone can receive type O red blood cells, and type AB individuals can receive red blood cells of any ABO type. Therefore, people with type O blood are known as "universal donors," and those with type AB blood are known as "universal recipients". In addition, AB plasma donors can give to all blood types[15].

Knowledge of the frequencies of the different blood groups in Iraq and elsewhere is very important for Blood Banks and transfusion service policies.

The distribution of ABO blood groups and Rh phenotypes varies from race to race. About 95% of African-Americans are Rh-positive, where indigenous Africans are virtually 100% Rh-positive and Americans generally have frequencies of A, B, AB and O blood groups of 41%, 10%, 4% and 45% respectively [2]. In Kashmiri Population 'O' was the most prevalent blood group ie, 38.43%, while AB was the least prevalent group ie, 6.55%.

Majority 95.9% were Rhesus positive[3]. Among Western Europeans, 42% have group A, 9% group B, 3% group AB and the remaining 46% group O [4]. There is a big variations in the percentage of ABO blood types for some racial and ethnic distribution[16] as presented in the following table.

Percentage of ABO Blood Types Reported Racial and Ethnic Distribution

PEOPLE GROUP	O %	A %	B %	AB %
Turks	43	34	18	16
Greeks	40	42	14	5
English	47	42	9	3
French	34	47	7	3
Germans	41	43	11	5
Malaysians	62	18	20	0
Japanese	30	38	22	10
Peru (Indians)	100	0	0	0
Indians (USA-General)	79	16	4	1
Indians (India-General)	37	22	33	7
Black foot (N. Am. Indian)	17	82	0	1
Aborigines	61	39	0	0
South Africans	45	40	11	4

The aim of this study is to estimate ABO blood groups and Rh phenotypes in the population of Babylon governorate.

Materials and Methods

Retrospective study done in Babylon governorate. The study group included a total of 7317 donors, 7184 were males and 133 were females. All donors were registered in the central blood bank at Al-Hilla General Teaching Hospital during the period of (February 2007 to May 2007). The information of this study depends on the records (archives) available in this blood bank, and these records are:

Donors records which involve name, age, sex, time, and address.

Blood groups and Rh records.

Statistical analysis: the frequency distribution and proportions of ABO blood groups and Rh phenotypes were estimated from Babylon donors and analyzed contingency tables using standard methods rxc contingency chi-square test and confidence interval for population proportion[5].

Results

Seven thousand three hundred and seventeen donors, with a mean age of 32.8 ± 9.04 years (range, 14 to 86 years), of whom 7184(98.2%) were males and 133(1.8%) were females. Table (1) shows the frequency distribution of ABO blood groups and Rh phenotypes according to age, which presents the most donors within aged 21 to 40 years.

The distribution of ABO blood groups in both Rh positive and negative among donors are illustrated in Table(2). It shows that the overall blood group(O) is the highest (35.8%) among both Rh positive and negative subjects, while the AB blood group was the lowest (8.3%) and more than 90% of the population turned out to be Rh positive. Table (2) also shows 95%

confidence interval for the proportion proportion of A, B, AB, O and Rh phenotypes, the proportion of the ABO and the Rh phenotype was O+ (32.2%), followed by B+ (25.6%), A+ (25%), AB+ (7.4%). The lowest prevalence was that of AB- (0.9%). The prevalence of ABO blood group distribution studied in different counties of Babylon Governorate are illustrated in Table(3). The prevalence of group A positive was more in females (31.8%) as compared to males (24.9%), while group O positive was more frequent in males (32.2%) as compared to females (26.4%), Table (4). The prevalence of ABO blood group distribution studied in different times are illustrated in Table (5).

Discussion

This study has determined the frequency distribution of ABO blood groups and Rh phenotypes in Babylon governorate donors, these frequencies are used to estimate the ABO and Rh phenotypes in the population of Babylon.

The results show no relationship between age and ABO blood groups ($P > 0.05$). The ABO blood group shows group O is significantly higher compared with other groups, ($P < 0.01$); while groups A and B are found to be almost equal, ($P > 0.05$), and significantly more than group AB, ($P < 0.01$). The prevalence of ABO blood groups and Rh phenotypes of donors among the four regions in Babylon shows some variations and similar trends to overall Babylon donors $O > B \geq A > AB$ and it shows a relationship between ABO blood groups and region, ($P < 0.05$). There is no relationship between ABO blood groups and sex, ($P > 0.05$) and also the prevalence of group A positive is more frequent in females (31.8%) as compared to males (24.9%), while group O positive is more frequent in

males (32.2%) as compared to females (26.4%). There is no relationship between ABO blood groups and time of donation ($P > 0.05$). In addition this study shows the prevalence of (Rh positive and negative) were (90.13%) and (9.78%) respectively, which is significantly different compared with other Iraqi studies in Basrah ($P < 0.01$). The frequencies of Rh (+ve) and Rh (-ve) in Basrah are (93.01%) and (6.99%) respectively[14], and with other countries show similar trends, Table (6).

Usually, the distribution of ABO blood group varies from one population to another so the prevalence of ABO blood groups is varied compared with some other population countries appearing in Table (7). Group O higher than other groups as well as in other countries except Lebanon, Syria, and Jordan where group A is higher than O[9,10,11].

Conclusion

The current study estimates the distribution of ABO blood groups and Rh in the population of Babylon Governorate. It is recommended to conduct similar studies in different parts of Iraq in order to determine the ABO blood group frequencies in different regions and sex, and hence we can estimate ABO blood groups and Rh phenotypes distribution of Iraqi population.

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Table 1 Frequency Distribution of ABO Blood Groups and Rh Phenotypes according to Age to Babylon Population Donors.

age (Year)	ABO and Rh Phenotypes							
	A+	A-	B+	B-	O+	O-	AB+	AB-
11.00 - 20.00	64	8	63	11	75	10	8	3
21.00 - 30.00	672	81	697	65	870	100	208	23
31.00 - 40.00	570	50	568	66	722	78	161	18
41.00 - 50.00	160	17	166	13	237	28	60	10
51.00 - 60.00	63	8	64	4	75	6	20	5
61.00 - 70.00	12	0	13	2	9	2	6	0
71.00 - 80.00	1	0	0	0	4	1	0	0
81.00 - 90.00	0	0	4	0	0	0	0	0

Table 2: Prevalence of ABO and Rh Phenotypes in Babylon Population Donors.

ABO & Rh Phenotype	No. of Donors	Prevalence	95 % confidence interval	
			Lower limit	Upper limit
A Rh-positive	1829	25.00 %	0.231	0.269
A Rh-negative	198	2.70 %	0.016	0.038
Total A	2027	27.70 %	0.267	0.287
B Rh-positive	1871	25.60 %	0.237	0.275
B Rh-negative	194	2.70 %	0.020	0.034
Total B	2065	28.30 %	0.272	0.293
O Rh-positive	2353	32.20 %	0.302	0.338
O Rh-negative	265	3.60 %	0.032	0.039
Total O	2618	35.80 %	0.347	0.369
AB Rh-positive	542	7.40 %	0.063	0.085
AB Rh-negative	65	0.90 %	0.005	0.013
Total AB	607	8.30 %	0.077	0.089
Rh-positive	6595	90.10 %	0.894	0.908
Rh-negative	722	9.90 %	0.092	0.106
Grand Total	7317	100.00 %		

Group O vs. other groups ($P < 0.01$), Group A vs. Group B ($P > 0.05$)

Groups A & B vs. Group AB ($P < 0.01$).

Table 3 Prevalence of ABO Blood Groups and Rh Phenotypes Distribution in different Districts.

ABO & Rh Phenotypes	County							
	Hilla		Hashimya		Mahaweel		Musayeb	
	No.	%	No.	%	No.	%	No.	%
A+	899	26.2	322	24.4	248	24.2	211	22.6
A-	95	2.8	40	3.0	21	2.0	22	2.4
AB+	249	7.3	117	8.9	76	7.4	60	6.4
AB-	39	1.1	8	0.6	7	0.7	8	0.9
B+	895	26.1	326	24.7	247	24.1	242	25.9
B-	95	2.8	24	1.8	33	3.2	21	2.2
O+	1048	30.6	435	33.0	349	34.0	332	35.5

O-	109	3.2	48	3.6	45	4.4	38	4.1
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Table 4 Prevalence of ABO Blood Groups and Rh Phenotypes Distribution according to Sex.

ABO & Rh Phenotypes	sex	
	Female	Male
	%	%
A+	31.8	24.9
A-	1.6	2.7
AB+	7.0	7.4
AB-	0.8	0.9
B+	26.4	25.6
B-	3.1	2.6
O+	26.4	32.2
O-	3.1	3.6

Table 5 Prevalence of ABO Blood Groups and Rh Phenotypes Distribution Among Months.

ABO & Rh Phenotypes	Month							
	February		March		April		May	
	No.	%	No.	%	No.	%	No.	%
A+	265	25.7	511	25.3	536	24.7	517	24.7
A-	27	2.6	51	2.5	58	2.7	62	3.0
AB+	68	6.6	162	8.0	168	7.7	144	6.9
AB-	15	1.5	11	0.5	13	0.6	26	1.2
B+	288	27.9	536	26.5	536	24.7	511	24.4
B-	27	2.6	54	2.7	60	2.8	53	2.5
O+	296	28.7	632	31.3	729	33.6	696	33.2
O-	45	4.4	63	3.1	72	3.3	85	4.1

Table 6 Prevalence of Rh Phenotypes in some Arabic Countries compared with the present study

Country	Rh-positive %	Rh-negative %
Present study	90.13	9.87
Hadhrumout[6]	92.90	7.10
Saudi Arabia[7]	91.50	8.00
Kuwait[8]	92.50	7.50
Bahrain	91.80	8.20

Table 7: Prevalence of ABO Blood Groups compared with some other Countries.

Country	O %	A %	B %	AB %
Present study	35.78	27.70	28.22	8.30
Hadhrumout[6]	51.50	29.60	16.60	2.30
Saudi Arabia[7]	52.00	24.50	17.00	4.00
Kuwait [8]	35.00	29.00	23.00	14.00
Lebanon[9]	36.11	47.25	11.52	5.12
Syria[10]	37.50	46.25	13.13	3.12
Jordan[11]	36.62	38.36	18.04	6.98
Gujrat (Pakistan) [12]	55.96	17.40	22.29	4.35
Bahrain[13]	46.80	41.70	8.60	3.00
America*	45.00	40.00	11.00	4.00

* According to AABB (American Association of Blood Banks), the distribution of blood types in the U.S.