



Proceeding

ABO and Rhesus Blood Group Distribution in Blood Donors, Blood Transfusion Centre, Faculty of Medicine, Khon Kaen University, Thailand

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Background and objective: ABO and Rhesus (Rh) blood groups antigen is the most important and useful in compatibility for patients. The aim of this study was to determine the distribution or prevalence of ABO and Rh blood groups in blood donors between June 2013 to May 2017 (4 years).

Method: The study was concluding on 62,201 blood donors. The blood group antigens of ABO and Rh were confirmed by micro-column gel technique. Doubtful case was confirmed by standard conventional tube method. Age, sex, prevalence of ABO and Rh were reported in percentage.

Result: Female blood donors were more than male (52.8 and 47.2%, respectively). The blood group A, B, O and AB were 20.3, 34.7, 37.5 and 7.5%, respectively. The prevalence of Rh (D) positive and negative was 99.8 and 0.2%. Blood group frequency with respect to A, B, O and AB were 0.04, 0.05, 0.07 and 0.01%, respectively. Total of Rh (D) negative was 0.2%. The age of blood donors divided into ≤ 18 , 19-30, 31-40, 41-50, 51-60 and >60 years old were 4.4, 50.5, 18.9, 16.6%, 9.2, and 0.4%, respectively. The repeated blood donor's rate was 4.9%.

Conclusion: Blood groups distribute into O>B>A>AB. The prevalence of Rh (D) negative of Thais normally 0.1% to 0.3%, in our data found 0.2%. Therefore, this prevalence should be related with patients' blood group for target group blood donation.

Key Words: ABO and Rhesus, blood group prevalence

Introduction

Overall of distribution of ABO blood group worldwide were O : A : B : AB by 49:42:9:3 ratio¹. But in Thai's population was a bit different by; O, B, A and AB were 37-44%, 34-37%, 18-21% and 4.7-7%, respectively². Blood Bank, Army institute of Pathology, Bangkok, Thailand reported the distribution of blood group systems in Thai blood donors determined by gel test ,group O is the most common (40.5%) followed by group B (30.5%) , group A (20.5%) and group AB (8.5%). The ABO system has made blood transfusion easy; therefore, abating complications such as hemolytic and other transfusion-related adverse reactions resulting from incompatible blood transfusion. There are many blood group systems on the basis of different blood group



antigens, but the distribution of ABO and Rhesus system be benefit for estimated and it is essential for effective management of blood stock inventory. The prevalence of ABO and Rhesus varies with race, ethnicity and region. Then Blood Transfusion Centre, faculty of Medicine must be reported our own distribution. The retrospective study was carried out on 62,201 blood donors (both voluntary and replacement), 138,376 units, between June 2013 to May 2017. The aims of this study were to examine the ABO and Rhesus distribution in Blood Transfusion Centre, Faculty of Medicine, Khon Kaen University, Thailand.

Method

The data were collected from database at Blood Transfusion Centre, Faculty of Medicine, Khon Kaen University , Thailand. The data of blood donors during period of five years (June 2013 to May 2017) were analysed. These included both of voluntary and replacement blood donors in the blood centre or mobile blood donation units. All donors were screening for blood donation by AABB guideline¹.The donors were required to fill up registration form, which carry the information such as personal details, demographic, occupational and medical history. The donors were ABO and Rhesus blood group screening by micro-column gel test, in case of uncompleted the sample will be confirmed by conventional tube method. For statistical analysis, the distribution of blood group systems were compared with other studies in Thai population by chi-square test. Cell- serum grouping and Rhesus typing were done and duplicated check, and verified to the system. Rhesus negative must be confirmed with D-antigen typing, weak D group were considered as Rhesus positive blood group. All reagents were used according to quality control submitted. The data's were discussed by sex comparisons; the ABO and Rhesus blood group were described in percentages and compared with the distribution which reported in Thai population, by chi-square test.

Result

In age and sex of blood donors, we found female (52.8%) donated more than male (47.2%), and donor's age between 19-30 years old(female and male) was the highest age-group to be blood donors(50.5%) as shown in Table 1.

Table 1 Described of age and sex in mobile blood donor's group

Age(years)	Male n (%)	Female n (%)	Total n (%)	p-value
≤18	1,126 (1.7)	1,704 (2.7)	2,866 (4.4)	0.000
19-30	14,304 (22.3)	18,108 (28.2)	32,412 (50.5)	
31-40	5,892 (9.2)	6,217 (9.7)	12,109 (18.9)	
41-50	5,300 (8.3)	5,336 (8.3)	10,636 (16.6)	
51-60	3,494 (5.4)	2,416 (3.8)	5,910 (9.2)	
≥61	200 (0.3)	68 (0.1)	268 (0.4)	
Total	30,316 (47.2)	33,885 (52.8)	64,210 (100)	



The ABO and Rhesus distribution found were O (37.5%), B (34.7%), A (20.3%) and AB (7.5%), respectively. And the Rhesus negative were found only in 114 donors (0.2%), as shown in Table 2.

Table 2 The distribution of ABO and Rhesus blood groups in male and female

ABO/Rhesus blood group	Male n (%)	Female n (%)	Total n (%)	p-value
A	6,144 (9.6)	6,862 (10.7)	13,006 (20.3)	0.046
B	10,478 (16.3)	11,828 (18.4)	22,306 (34.7)	
O	11,478 (17.9)	12,558 (19.6)	24,036 (37.5)	
AB	2,216 (3.4)	2,637 (4.1)	4,853 (7.5)	
Rhesus positive	30,263 (47.1)	33,824 (52.6)	64,087 (99.8)	0.876
Rhesus negative	53 (0.1)	61 (0.1)	114 (0.2)	
Total donors	30,316 (47.2)	33,885 (52.8)	64,210 (100)	

The distribution of the Rhesus positive and negative was not significant different ($p > 0.05$) when compare between ABO blood group. The percentage of Rhesus negative was 0.2%, as shown in Table 3, 4

Table 3 The distribution of the Rhesus blood group in ABO blood group

ABO blood group	Rhesus positive	Rhesus negative	p-value
A	12,980 (20.2)	26 (0.04)	0.627
B	22,273 (34.7)	33 (0.05)	
O	23,990 (37.4)	46 (0.07)	
AB	4,844 (7.7)	9 (0.01)	

Table 4 Frequency of blood groups in different countries in percentage

	A (%)	B (%)	O (%)	AB (%)	Rhesus-positive (%)	Rhesus-negative (%)
Britain	42.0	8.0	47.0	3.0	83	17
USA	41.0	9.0	46.0	4.0	85	15
Saudi Arabia	24.0	17.0	52.0	4.0	93	7
India	29	38	22	12	94	6
Thai	17.9	29.3	46.2	6.6	98	2
Blood donors in this study	20.3	34.7	37.5	7.5	99.8	0.2



Discussion

The study done in Thai and in Army Institute of Pathology, showed blood group O was the most common, followed by B, A and AB⁴. The finding in Blood donors of Blood Transfusion Centre, Faculty of Medicine, Khon Kaen University showed the same results.

The incidence of Rhesus (D) negative equal 0.2%, this was very low and be the problem of blood inventory in our blood bank. Solution in this case, we have made records of blood donors with blood type Rhesus (D) negative. In case of need urgent blood, it can be donated to patients in time as needed.

African-American and Caucasian of America although the proportion of blood group O was slightly below 50%, ranging from 40 to 47%. Other studies in the Red Cross Society of Australia and USA^{3,5} have shown highest to lowest frequency by O, A, B and AB, respectively. Our study showed different from those reports.

Conclusion

This study showed, blood donation by female was higher than male. The incidence of Rhesus (D) negative equal 0.2%. And as we know the plasma from female (immunized by pregnancy) donation has risk to TRALI so blood donor campaign should be consider for rise up male donors.

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