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Original Article

Frequency and Distribution of ABO and Rhesus Blood Group of Blood Donors

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Abstract

Introduction: *ABO blood group was discovered by Landsteiner in 1900. ABO and Rhesus blood group antigens are important in transfusion medicine and its incidence differ in races, ethnic groups and socio-economic groups.*

Material and Methods: *This retrospective study was conducted in blood bank of district hospital associated with government medical college, Khandwa during 6-months period between 1 January 2019 to 30 June 2019. 3300 individuals were considered fit for donating blood. Age range between 18 and 60 years. The donors who's haemoglobin more than 12.5 gm% were selected and screened by medical officer. ABO and Rhesus blood groups were determined by slide test and tube method.*

Results: *The common age group for blood donation was 21-30 years. Out of 3300 donors, 98% were males and 2% were female. The commonest blood group was B (33.91%) followed by O (29.12%), A (26.78%), AB (10.29%). ABO blood group pattern in decreasing order was B > O > A > AB. Rh-positive donors were 95.3% and Rh negative were 4.7 %.*

Conclusion: *This Blood group study will be helpful in health care planning, running of organized, efficient and safe blood transfusion services.*

Keywords: *ABO, Rhesus Blood groups, donors, frequency, distribution.*

Introduction

Karl Landsteiner was an Austrian immunologist, who discovered ABO blood group system in 1900.(1) Second blood Group System is Rhesus system, there are two phenotypes e.g. Rh positive and Rh negative. Recently more than 50 antigens in Rhesus blood group system are included.(2,3) Genes for ABO antigens and Rhesus antigens are

located on 9th chromosome and 1st chromosome respectively, which are useful in paternity testing.[4] ABO antigens are important for blood transfusion which are expressed on red cell membrane. The antigens are situated on the red cell membrane, which are react with their specific antibodies causes agglutination of the red cells.[5,6] Blood bank requires informations and statics for smooth running of blood transfusion services. The aim is determination of the frequency and distribution of ABO and Rhesus blood groups. This retrospective study was provided blood group data and social awareness.

Materials and Methods

This retrospective study was carried out in the blood bank of district hospital, Khandwa associated with government medical college, Khandwa during a 6-months period between 1 January 2019 to 30 June 2019. 3300 donors were considered medically fit for blood donation. Age range between 18 and 60 years. The blood collections were taken from the voluntary donors at outdoor blood donation camp and in blood bank.

The donors fill up the registration form with medical history. Those donors with haemoglobin more than 12.5 gm% were selected and screened by a medical officer. ABO and Rh status were determined by slide method and tube method using commercially prepared anti-A, anti-B, anti-AB and anti-D antisera blood types. Prepared 5% red cell suspension in normal saline were used. Reverse blood grouping was performed by test tube agglutination method with pooled known A, B, and O cells that are being prepared daily at the blood bank. The donor blood group data were recorded on proforma, tables, analysed and compared with the similar studies. The result was calculated in frequency and each blood group expressed as percentage.

Results

The most common age group for blood donation in the study area was found between 21-30 years. 3300 individuals, 98% were males and 2% were female. The commonest blood group was B (33.91%) followed by O (29.12%), A (26.78%), AB (10.29%). The prevalence of Rhesus positive and negative distribution in this study was found 95.3% and 4.7%. ABO group pattern was shown B > O > A > AB

Table 1 Gender and age distribution of the participants

Age group (in years)	Male (%)	Female (%)	Total (%)
18-20	10.95	0.3	11.25
21-30	36.37	0.8	37.17
31-40	29.61	0.6	30.21
41-50	17.03	0.2	17.23
51-60	4.13	0.1	4.14
Total	98	2	100

Table 2: Rhesus blood group according to gender

Rh blood group	Male	Female	Total
+/-	%	%	%
Rh +	94.8	0.5 %	95.3 %
Rh -	3.2	1.5 %	4.7 %
Total	98 %	2 %	100 %

Table 3: Distribution of blood donors according to rhesus phenotype

Blood group	Rh +	Rh -	Total
A	25.82 %	0.96 %	26.78 %
B	32.23 %	1.68 %	33.91 %
O	27.66 %	1.46 %	29.12 %
AB	9.66 %	0.63 %	10.29 %
Total	95.3 %	4.7 %	100 %

Discussions

This study determine the distribution and frequency of ABO and Rh antigens among blood donors. The most common age group for blood donation in this study was found between 21-30 years which is similar to studies of Pranab Choudhury et al[8], Sachin Badge et al[9], Bhakti Dattatraya Deshmukh et al[4] and Ola Jahanpour et al[3] are reported same results. The improved interest and ability among younger adults to donate it may be related to awareness, better physical health and greater mobility. Among 3300 donors, 98% were male and 2% females which is similar to the study of Sachin Badge et al[9] (99.43%) were males and (0.57 %) females, Soonam John[10] et al reported (98.87%) male and 1.13% female, Bhakti Dattatraya Deshmukh et

al[4] reported (96.30%) were males and (3.70%) were females. Women do not meet donation cut-off values for haemoglobin given normal menses, menorrhagia, prenatal iron deficiency anaemia and postnatal blood loss.[3] The main reasons behind it were lack of education, social taboo, cultural habits, lack of motivation, and fear of blood donation. Most of the older people suffer from hypertension, diabetes mellitus, low haemoglobin, and ischemic heart diseases and found unfit during predonation counselling.[11]

The commonest blood group was B (33.91%) followed by O (29.12%), A (26.78%), AB (10.29%) which is similar to the study of Bhakti Dattatraya Deshmukh et al[4] reported blood group B (30.68%), O (30.56%), A (28.73%), AB (10.03%) in same order. The most common blood group found was B (33.91%) and least common being AB (10.29%) which is similar to the studies of Satish Kumar et al[11] reported blood group B (31.68%) and least common being AB (11.70%), Bhakti Dattatraya Deshmukh et al[4] reported blood group B was (30.68%) and least common AB was 10.03%. AB had the least frequency (10.29%) which is similar to the studies of Sachin Badge et al[9], Shamima Nasrin Shadia et al[12], Dr Bisusingh et al[13], Pranab Choudhury et al[8], Lemu Golassa et al[7], Soonam John et al(10). All are reported least common blood group AB 13.52%, 9.6%, 7.49%, 11.8%, 3.34%, 6.25% respectively.

The prevalence of Rhesus positive and negative distribution in this study population was found 95.3 % and 4.7% respectively, which is similar to the studies of Satish Kumar et al[11] reported Rh +ve 93.51% and Rh –ve 6.49%, Sachin Badge et al[9] reported (99.42%) were Rh positive while only 75 (0.58%) were Rh negative. Shamima Nasrin Shadia et al[12] reported rhesus positive (96 %) while rhesus negative was (4 %). Bhakti Dattatraya Deshmukh et al[4] reported Rh+ve donors were predominant constituting 95.16% whereas only 4.84% donors were Rh-ve. Dr Bisu Singh et al[13] reported 99.47% of donors were Rh positive and 0.53 % was Rh negative. Sushama Chandekar et al[14] reported Rh positivity (94.62%) donors while (5.38%) donors were Rhesus negative. Pranab Choudhury et al[8] reported Rh-positive group (94.5%) whereas 5.5% of the donors were from Rh-negative group.[8] Ola Jahanpour et al[3] reported Rh+ve 97.7 % and Rh-ve 0.3%, Shanaz Karim et al[15] reported Rh-D positive were (96.79%) and Rh-D negative were (3.2%). Adrián Canizalez-Román et al[16] reported 95.58% of people were Rh (D) and 4.42% were Rh (d). Yona Mbalibulha et al[17] reported Rh +ve 96.2% and Rh-veblood group percentage was 3.8%.

Blood group O was initially regarded as a universal donor and so can be given to anybody with any other blood group. Some blood group O individuals have high titre of haemolysin, anti-A and anti-B antibodies in their plasma. It may cause haemolytic transfusion reaction and death when such blood group O is transfused to anybody with any other blood type apart from group O.[12] Sex does not show any effect on the ABO and Rh blood grouping of the donors some females could not be accepted as blood donors as they were suffering from nutritional anaemia and low body weight because of better implementation of primary health-care system, less numbers of women are suffering from nutritional anaemia than many other parts of India.[8] "B" as the most frequent and "O" as the second most common blood group which is in agreement with this present study.

Conclusion

ABO blood group pattern in decreasing order was B > O > A > AB. Rh-positive donors were 95.3% and Rh negative were 4.7 %. Blood donation by females was very low because of lack of awareness about blood donation, it needs to be increased by improving health status. Blood group of donors should be indicated on identity cards, driving licenses, which will be use in acute haemorrhage or anaemia in children when urgent blood transfusion is required. This study will be useful in health care planning, running of

organized, efficient and safe blood transfusion services. This study of Blood group is helpful for running of blood transfusion services.

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