



"PHENOTYPIC PROFILE OF ABO AND RH BLOOD GROUP ANTIGEN AMONG BLOOD DONORS IN M.P., CENTRAL INDIA"

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ABSTRACT

Background & Aims :- ABO antigen was discovered by Karl Landsteiner and Wiener. In later years, because of its immunogenicity along with Rh grouping, ABO and Rh antigen testing was made mandatory before issuing blood, this study was carried out to know the distribution of ABO and Rh antigen in the population of Madhya Pradesh, Central India.

Method:- This study was carried out at Shyam Shah Medical College Rewa, India from Jan 2014 to Dec 2016. Total 30310 donor blood samples collected and samples were tested for ABO and Rh group by tube agglutination method.

Result:- Out of 30310 samples, blood group "O" (37.78%) was found to be most prevalent followed by B, A, and AB. The incidence of Rh+ve positive antigen was 95.71% and Rh-ve was 4.29%.

Conclusion:- The ABO and Rh blood group system has a vital role in population genetic study, in resolving medicolegal issues and most importantly in transfusion practices.

KEYWORDS : ABO and Rh grouping, phenotype, prevalence

Introduction

Although blood transfusions can save life but they are not without risk. Transfusion of blood associated with the risk of serious hemolytic transfusion reaction by antibody incompatibility. The importance of ABO blood group system is due to the fact that it is the only blood group system in which antibodies are constantly, predictably and naturally present in the serum of the people who lack the antigen (1). These ABO antibodies are IgM in nature and cause the intravascular hemolysis in the ABO mismatch transfusion while importance of Rh blood group system is because of immunogenicity, polymorphism and complexity of its antigens. Blood groups are known to have association with diseases like Rh incompatibility and ABO incompatibility of newborn (2). The frequencies of ABO and Rh blood group vary from one population to another and time to time in the same region. The prevalence of ABO and Rh group varies markedly in different ethnic groups, races and socio-economic groups in different parts of the world. Knowledge of the distribution of ABO and Rh blood groups is helpful in safe blood transfusion services (3,4) and to prevent the erythroblastosis fetalis, which commonly arises when an Rh-negative mother carries an Rh-positive fetus. This study aimed to provide data regarding the frequency of ABO and Rh blood group antigens with their phenotypic expression in Central India and to compare with other ethnic groups and races.

Materials and Methods

The present retrospective study was carried out at Deptt. of Pathology, Sanjay Gandhi Memorial Hospital Rewa (M.P.) during the period from Jan 2014 to Dec 2016 (3-year duration). Total 30310 donors were considered medically fit and accepted for blood donation during the study period. Donor name, age, sex, occupation, complete postal address and contact number was taken. Blood was taken for donors who were between 18-60 years of age, more than 50 kg weight with hemoglobin more than 12.5 gm%. Blood group was determined by forward blood grouping by test tube agglutination method. Reverse blood grouping was performed by test tube agglutination method with pooled known A, B, and O cells. All weak D groups were considered as Rh positive.

Result:-

Table no. 2 shows, out of 30310 blood donors, majority 27855 (91.90%) were male and female donor were 2455 (8.10%). Table no. 2 shows distribution of blood donors according to Rh phenotype. Most blood donors were 29009 (95.71%) Rh+ve while only 1301 (4.29%) were Rh-ve. Amongst male donors blood group "O" was found to be most prevalent group (37.90%) followed by group B (31.30%), A (22.47%) and AB (08.33%). Amongst female donor again

blood group "O" was most common (36.50%), followed by group B (35.70%), A (16.04%) and AB (11.80%). The total of ABO blood group was group "O" (37.78%) followed by B (31.65%) group (21.95%) and group AB (8.60%).

Table No 1- sex wise distribution of blood donors.

s.no.	Blood group	Male donor	Female donor	Total
1.	A	6260(22.47%)	394(16.04%)	6654(21.95%)
2.	B	8718(31.30%)	876(35.70%)	9594(31.65%)
3.	O	10557(37.90%)	896(36.50%)	11453(37.78%)
4.	AB	2320(08.33%)	289(11.80%)	2609(08.60%)

Table No. 2- comparison of Rh positive and Rh negative between male and female donors.

Gender	No. of blood donors	No. of Rh+ve blood donors	No. of Rh-ve blood donors
Male	27855(91.90%)	26768(96.10%)	1087(03.90%)
female	2455(08.10%)	2241(91.32%)	214(9.54%)
Total	30310	29009(95.71%)	1301(4.29%)

Discussion:-

In our study, majority of donors were male donors (91.90%) compared to female donor. Similar findings were found in most of the studies done in India (7), this is because large numbers of females from the menstruating age group are usually anemic with underweight so declared unfit for blood donation. In addition, lack of motivation, fear of blood donation and cultural habits leads to less donation by female donor compared to male. The ABO blood group system is important in blood transfusion, erythroblastosis in newborn, organ transplantation, cardiovascular diseases and obesity (8), so it is advisable to do ABO and Rh grouping studies in each region for drafting proper national transfusion policies. In our study, the ABO and Rh positivity in male and female donors showed that the blood group "O" positive was most prevalent in both male and female followed by group B, A, and AB. Similar results were also found in studies done in USA and UK (5). Studies from India also showed that blood group "O" was commonest followed by B, A, and AB (9). Reliable population-based frequency data of ABO and Rh antigens study has a vital role in population genetic study, in resolving medicolegal issues and most importantly in transfusion practice.

Table No.3 comparison of distribution (%) of ABO and Rh blood groups in different countries of the world

Countries	A (%)	B(%)	O(%)	AB(%)	Rh+ve(%)	Rh-ve(%)
USA(5)	41.00	9.00	46.00	4.00	85.00	15.00
UK	41.70	8.60	46.70	3.00	83.00	17.00
Saudi Arabia(6)	25.00	19.00	52.00	4.00	93.00	7.00
Nigeria	24.43	23.88	48.94	2.75	95.67	4.33
Present study	21.95	31.65	37.78	8.60	95.71	4.29

Conclusion

Our study concluded that , the commonest ABO blood group was group "O" followed by B, A, and AB group in central india. Rh positive donors were 95.71% and Rh negative were 4.29% . Blood donation by the female was low and it needs to improve health status of female donors. Here we recommended that reliable population based data of ABO and Rh antigens needed to draft proper national transfusion policies.

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