"Frequency of ABO and Rhesus Blood Groups in Healthy Donors in a Regional Blood Transfusion Centre of North India"

Shivali Sehgal1 and Chintamani Pathak2

1Department of Pathology, Hamdard Institute of Medical Sciences and Research
2Department of Pathology, VMMC and Safdarjung Hospital

INTRODUCTION

Among the various blood grouping systems discovered so far, the ABO and Rh systems remain to be the most important blood group systems till date. They are essential for blood transfusion medicine, parental testing, forensic medicine and population genetic studies. The incidence of ABO and Rh varies markedly in different races and ethnic groups in different parts of the world (http://www.bloodbook.com; & Patel, P.A. et al., 2012). This is due to the influence of genetic and environmental factors.

Rare blood groups make transfusion a challenging issue in a country like India due to the low rate of voluntary blood donations. The aim of this study was to determine the frequency of ABO and Rh blood groups in healthy donors in blood bank of a tertiary care hospital in New Delhi. The distribution pattern was also determined among the voluntary donors (both in house voluntary donors and camp donors).

METHODS

This was a retrospective study conducted in Regional Blood Transfusion Center, Lady Hardinge Medical College, New Delhi. All the blood donors (including in house donors and camp donors) registered in blood bank from July 2014 to June 2015 were included in the study. Records of blood groups of donors were checked and care was taken to eliminate repeated donors. ABO and Rh typing was done using slide agglutination method with ABO and Rh antisera (Tulip diagnostics Ltd) which was confirmed by tube agglutination method. Both forward and reverse grouping was performed. In all cases with Rhesus blood group negative, weak D testing was also performed and all weak D donors were considered as Rhesus positive. Statistical evaluation included calculation of the frequency of all the ABO and Rh blood groups which were reported as percentage of the total population. The frequencies of the various blood groups in the total donor population were compared with that in the voluntary donor population and the p value was calculated.
RESULTS

<table>
<thead>
<tr>
<th>A+</th>
<th>B+</th>
<th>O+</th>
<th>AB+</th>
<th>A-</th>
<th>B-</th>
<th>O-</th>
<th>AB-</th>
</tr>
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<tbody>
<tr>
<td>2452</td>
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<td>3135</td>
<td>1173</td>
<td>134</td>
<td>181</td>
<td>154</td>
<td>58</td>
</tr>
<tr>
<td>(21.81%)</td>
<td>(35.17%)</td>
<td>(27.89%)</td>
<td>(10.43%)</td>
<td>(1.19%)</td>
<td>(1.61%)</td>
<td>(1.37%)</td>
<td>(0.52%)</td>
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TOTAL DONATIONS (11241)

<table>
<thead>
<tr>
<th>TOTAL VOLUNTARY DONATIONS (IN HOUSE+CAMP)</th>
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<tbody>
<tr>
<td>339</td>
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<td>(23.06%)</td>
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Table 1: Summary of the ABO and Rh blood group distribution in blood bank donors

Table 1 summarizes the blood group (ABO and Rh) distribution in blood bank donors. In the ABO system, the most common blood group was B and the least common was AB (Rh positive donors were more common than negative ones in both the categories). Overall, Rh positive donors were much more common than Rh negative ones (95.3% versus 4.7%). In both Rhesus positive and negative individuals, the order of ABO blood group frequency was found to be as follows: B>O>A>AB. Voluntary donors accounted for 13.08% of the total donations; out of which 94.4% were Rh positive. The percentage of Rh negative donors was found to be higher (5.6%) in this group as compared to that in the total donor population (4.7%) amongst donor population (p=0.009). The ABO blood group frequency among voluntary donors in the Rh positive group was B>O>A>AB, while in the Rh negative group the order was O>B>A>AB (Table 1). So, B negative was the most common rhesus negative blood group amongst all donors (replacement as well as voluntary donors) while O negative was the most common amongst voluntary donors. AB negative was the least common in both these groups.

DISCUSSION

There is a wide variation in blood group frequency in different parts of the world due to genetic and environmental factors. Knowledge of blood group distribution is important for clinical and genetic studies, geographical information and medicolegal issues (eg: disputed paternity).

The most common ABO blood group in North India has been reported to be the B group in previous studies. The percentage frequency of this blood group was found to be similar in the current study (Tiwari, A. et al., 2011; & Maheshwari, P. 2011). In contrast, studies from South India show predominance of O blood group (Das, P. K. et al., 2001; Periyavan, S. et al., 2010; & Nag, I. et al., 2011).

Knowledge of distribution of ABO and Rh blood groups is essential for effective management of a blood bank’s inventory and transfusion services (Enosolease, M. E., & Bazuaye, G. N. 2008). It also helps in providing comprehensive data regarding the availability of blood components in special conditions. It allows preparation of regional cell panels for detecting blood groups in cases with blood grouping discrepancy and to provide compatible blood to the patients. It also helps in determining the recruitment of voluntary donors as required for each zone across the country. It is also useful for population genetic studies, research of population migration patterns and resolving certain medicolegal issues (Calhoun, L., & Petz, L.D. 2001; & Polesky, H.F. 1996).

The percentage of Rh negativity amongst the voluntary donors was higher compared to that in the general population of donors. This may be due to a higher awareness in these voluntary donors for the need of blood and about the pros and cons of donation.
The percentage of O negative donors was higher in the voluntary donor population as compared to the percentage in the donor population overall. Therefore, efforts should be made to promote voluntary donation in our country and organize as many camps as feasible. It is important to increase the number of voluntary donations so that blood can be provided to all patients in emergency situations without waiting for replacement donors.

REFERENCES