International Journal of Basic and Applied Medical Sciences ISSN: 2277-2103 (Online) An Online International Journal Available at http://www.cibtech.org/jms.htm 2012 Vol. 2 (3) September - December, pp.74-78/Purandare and Prasad **Research Article**

DISTRIBUTION OF ABO BLOOD GROUPS IN HEALTHY YOUNG ADULTS IN PUNE CITY

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ABSTRACT

Blood groups of people are determined genetically by the presence of specific antigens on the red blood cells. Finding out blood groups is important for blood transfusion, prevalence of different diseases, genetic studies etc. Different blood group systems are available for classification. ABO blood group system is one of them. In the present study we found out ABO blood groups of 1000 healthy people from the age group of 18 to 25 years from Pune city. Out of 1000 subjects 523 were males and 477 were females. The commonest blood group present was found to be O blood group, followed by B, A and AB blood groups in this region.

Key Words: Blood Groups, ABO

INTRODUCTION

The ABO blood group system is widely credited to have been discovered by the Austrian scientist Karl Landsteiner, who found three different blood types in 1900 (Garraty et al., 2000). He described A, B and O blood groups for which he was awarded the Nobel Prize in 1930. Alfred Von Decastello and Adriano Sturli discovered the fourth type AB, in 1902 (Von decastella and Sturli,1902).ABO blood groups are genetically determined by the presence of agglutinogens on the cell walls of red blood cells. ABO blood group system is one of the most common ones useful in blood transfusion, organ transplantation, finding out association of blood groups and diseases etc. ABO blood group system divides people into four types of blood groups namely A, B, O and AB. Percentages of people belonging to these blood groups are different in different communities. Distribution of these blood groups is also different in different races. The frequencies of ABO blood groups vary from one population to another and time to time in the same region. The knowledge of distribution of ABO blood groups at local and regional levels are helpful in the effective management of blood banks and safe blood transfusion services (Patel Piyush et al., 2012). Thus, this shows that the need for blood group frequency studies is multipurpose which can also be utilized in genetic research, anthropology and tracing ancestral relation of humans(Khurshid et al., 1992). Hence the present study was planned with the aim to determine the distribution of ABO blood groups in healthy young adults in this region.

MATERIALS AND METHODS:

ABO blood groups of 1000 healthy young adults from 18 to 25 years of age from different areas of Pune city (Maharashtra, India) were found out. These healthy volunteers were drawn from the blood donation camps organized by B.J. Medical College & Sassoon General Hospital, Pune, India. The study was approved by the ethical committee of the institute. Out of these 1000 subjects 523 were males and 477 were females.

Blood groups were determined by tile agglutination method, by using commercially available Anti sera A and anti sera B (Tulip Diagnostics (p) Ltd). Cell suspension was prepared after taking a finger prick. 0.9% sodium chloride solution and 3.8% sodium citrate solution were used to prepare cell suspension.

After finding out the ABO blood groups, phenotype and genotype frequencies of the subjects were also found out. The gene frequencies were calculated from the phenotype frequencies according to the Bernstein's formula (Race and Ruth Sanger 1962; Pedro Silva, 2002) given below:

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$$\begin{array}{l} p=1\text{-}\sqrt{\bar{O}+B}\\ q=1\text{-}\sqrt{\bar{O}}+\bar{A}\\ r=\sqrt{\bar{O}} \end{array}$$

Where; p= frequency of gene A,

q= frequency of gene B,

and r =frequency of gene O.

As p + q + r is not equal to 1 and deviation from 1 is called D, an improved estimate of the gene frequencies calculated as suggested by Bernstein is give below:

 $p = (1 + \frac{1}{2}D) (1 - \sqrt{O + B})$

 $\bar{q} = (1 + \frac{1}{2}D)(1 - \sqrt{\bar{O}} + \bar{A})$

 $r = (1 + \frac{1}{2}D)(\sqrt{O} + \frac{1}{2}D)$

 \overline{A} , \overline{B} and \overline{O} are the phenotype frequencies of groups A, B and O respectively.

RESULTS

ABO blood groups of 1000 healthy young adults from 18 to 25 years of age from different areas of Pune city were found out by tile agglutination method. We found that the percentage of blood groups in people in descending order was as follows: O > B > A > AB.

Table 1:	Distribution	According to	the Blood	Groups	Was /	As Follows
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Blood Group	Number of people	Percentage (%)
Α	275	27.5
В	289	28.875
0	375	37.5
AB	61	6.125
Total	1000	100%

Table 2: Abo Phenotypes and Their Frequencies

Blood Group	Number of individuals	Phenotype Frequency	Percentage
0	375	0.3750	37.50
В	289	0.2887	28.87
Α	275	0.2750	27.50
AB	61	0.0612	6.12

Table 3: Abo Gene Frequency and Their Percentage

Blood Group	Gene Frequency	Percentage
A(p)	0.1861	18.61
B (q)	0.1946	19.46
O(r)	0.6193	61.93

DISCUSSION

In this study we screened 1000 healthy young adults from 18 to 25 years of age from different areas of Pune city and found out their ABO blood groups by tile agglutination method. We found that the percentage of blood groups in people in descending order was as follows: O>B>A>AB as shown in

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table 1. The south Indian study by Das *et al.* shows that group O is the most predominant one, followed by group B and group A, which is in agreement with our study (Das PK *et al*,2001). Another south Indian study conducted on the population of Chittoor district of Andhra Pradesh also showed similar pattern of distribution of blood groups (Reddy KS, Sudha G,2009). Similar results were also found out by Sundar Periyavan et al and Mallikarjuna S (Sundar Periyavan *et al.*,2010;Mallikarjuna S,2001). In Nepal (Pramanik T, Pramanik S, 2000) as well as in Australia (Australian Red Cross society), Britain (Frances TF,2002) and USA (Mollison P L et al.,1993) 'O' and 'A' are the common blood groups that are followed by B and 'AB' We found the distribution of ABO blood groups in India according to the maps displayed on the website (http://anthro.palomar.edu/vary/vary_3.htm) as follows:



According to these maps, 60-70% Indians seem to have O blood group, 10-30% seem have B blood group and 15-25% seem have A blood group. (AB blood group is known to have least prevalence, though it is not shown in the maps).

According to these maps, prevalence of blood groups in Indians in descending order seems to be as follows: O>B>A>AB, which is similar to our findings.

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However, study done by Nanu and Thapliyal in the north Indian population report that group B is the most predominant one(Nanu A, Thapliyal RM,1997) as also reported in a study in neighboring Pakistan.(Afzal M *et al.*,1977)



Table 2 shows the ABO phenotypes and their frequencies. Similar results were also found by Javed Ahmed Latoo et al (Javed Ahmad et al., 2006). After studying the gene frequency we found that the gene O is most common, next follows the gene B and last is gene A (as shown in table no.3). Percentage of gene O is much more than gene B and gene A because of obvious addition of gene O from the phenotypes A and B having genotypes AO and BO respectively.

CONCLUSION

ABO blood groups of 1000 healthy young adults from 18 to 25 years of age from different areas of Pune city were found out by tile agglutination method. Out of these 1000 subjects 523 were males and 477 were females. We found that the percentage of blood groups in people in descending order was as follows: O> B>A>AB. The data generated in the present study and similar studies conducted in other states of India in order to determine the blood group frequencies in them will be useful for management of blood banks and transfusion services to the needy patients.

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