

DISTRIBUTION OF BLOOD GROUP IN BLOOD DONOR POPULATION IN WEST BENGALArpita Chatterjee Halder¹, Alpana De², Saibendu Kumar Lahiri³¹Assistant Professor, Department of Anatomy, College of Medicine and Sagore Dutta Hospital, Kolkata, West Bengal, India.²Professor and HOD, Department of Anatomy, RG Kar Medical College and Hospital, Kolkata, West Bengal, India.³Professor and HOD, Department of Community Medicine, RG Kar Medical College and Hospital, Kolkata, West Bengal, India.**ABSTRACT****BACKGROUND**

The ABO blood group and Rh type is unique to every single individual. Prevalence of blood groups of all four types is different in various regions of this world.

Aim: The present study is intended to detect the prevalence of blood group among blood donors in West Bengal, the eastern state of India.

MATERIALS AND METHODS

Blood donors donating blood to Institute of Blood Transfusion Medicine and Immunohaematology (IBTMI), Kolkata, West Bengal are studied. Over 2 lac blood donors for more than 2 years are tested for blood group and Rh type. Donors are categorised according to sex and the prevalence of blood group is tested. Data collected by IBTMI is used as secondary data.

RESULTS

The study results show the prevalence of blood group in this region as B > O > A > AB. The percentages of B +ve, O +ve, A +ve and AB +ve are 35.6%, 30.7%, 21.84% and 8.82%. The prevalence of Rh negative type is 2.96% (average). These are found to be similar in both sexes.

CONCLUSION

As different parts of the world have different distribution of blood group, the distribution of blood group in this particular part of the country is determined. This improves our knowledge on prevalence of blood group in the region of the country we live in.

KEY WORDS

Donor Population, ABO Blood Group and Rh Type.

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BACKGROUND

There are only 4 blood groups present all over the human race. Different blood groups vary in different populations, in different regions of the world. In this particular part of the world, the prevalence is found out targeting the blood donor population. The study was carried out with the following objectives-

1. To detect distribution of blood group and Rh type in the blood donor population of the specified area in West Bengal.
2. Distribution of blood group according to sex of blood donors.

MATERIALS AND METHODS**(a) Study Area**

Institute of Blood Transfusion Medicine and Immunohaematology (IBTMI), Kolkata, Vivekananda Road, Kolkata-700006, West Bengal and its collection area.

(b) Study Population

Blood donors (18 - 60 years) donating blood in the camps organised by IBTMI and at IBTMI when in-house collection is arranged.

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Corresponding Author:

Dr. Arpita Chatterjee Halder,

1/1f, Satin Sen Sarani, PO,

Kankurgachhi, Kolkata-700054, West Bengal, India.

E-mail: drarpitachat@gmail.com

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**(c) Study/ Data Collection Period**

2007 to 2009.

(d) Study Design

Descriptive study data collected and recorded at IBTMI are used as secondary data. Individual blood bags are collected and numbered during blood collection.

The Data are tabulated under the following Headings

1. Blood Bag No.,
2. ABO group of Donor's Blood,
3. Rh type,
4. Sex of the Donor.

The results were worked out in an Excel worksheet and results were analysed.

(e) Study Design

Institutional Record-Based Retrospective Study. The collected data are studied for individual blood group and sex of the blood donor. Prevalence of blood group and Rh type in the study population is calculated. Distribution of blood group in either sex (male and female) is calculated.

Blood Group	2007	2008	2009
A +ve	23281 (21.86%)	24997 (21.88%)	16934 (21.97%)
A -ve	791 (0.74%)	831 (0.725)	573 (0.74%)
B +ve	37836 (35.54%)	40624 (0.72%)	27429 (35.59%)
B -ve	1199 (1.12%)	1206 (35.56%)	850 (1.102%)

O +ve	32641 (30.66%)	35167 (30.79%)	23568 (30.58%)
O -ve	1030 (0.96%)	988 (0.86%)	645 (0.83%)
AB +ve	9362 (8.79%)	10072 (8.81%)	6856 (8.89%)
AB -ve	311 (0.29%)	328 (0.29%)	206 (0.26%)
Oh +ve	3 (0.00003%)	2 (0.00002%)	07 (0.00009%)
Total	106454	114215	77068

Table 1. Distribution of Blood Groups and Rh type in Blood Donors in the years 2007 to 2009

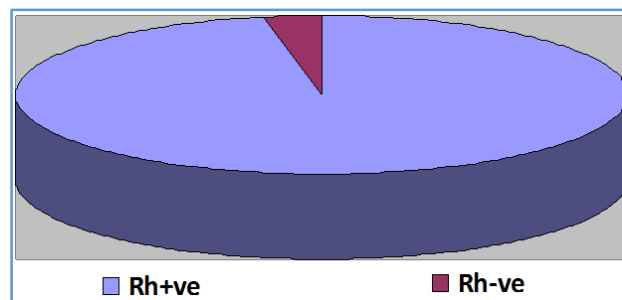


Figure 3. Distribution of Rh Type in Total Donor Population

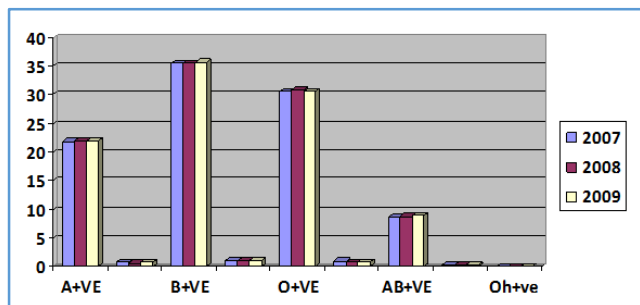


Figure 1. Distribution of Blood Groups and Rh Type in Blood Donors in the years 2007 to 2009

A +ve	Male Donors 58,366	21.9%	Female Donors 6,846	21.91%
A -ve	1,905	0.71%	290	0.92%
B +ve	94,814	35.57%	11,075	35.45%
B -ve	2,928	1.09%	327	1.04%
O +ve	81,738	30.67%	9,638	30.85%
O -ve	2,397	0.89%	266	0.85%
AB +ve	23,581	8.85%	2709	8.67%
AB -ve	766	0.29%	79	0.25%
Oh +ve	6	Negligible	6	Negligible
Total	2,66,501		31,236	

Table 4. Distribution of Blood Group and Rh Type in Male and Female Donors

Blood Group and Rh Type	Total No. of Donors	%
A +ve	65,212	21.9%
A -ve	2,195	0.74%
B +ve	1,05,889	35.56%
B -ve	3,255	1.09%
O +ve	91,376	30.69%
O -ve	2,663	0.89%
AB +ve	26,290	8.83%
AB -ve	845	0.28%
Oh +ve	12	0.004% (negligible)
Total	2,97,737	

Table 2. Distribution of Blood Group and Rh Type in Total Number of Blood Donors

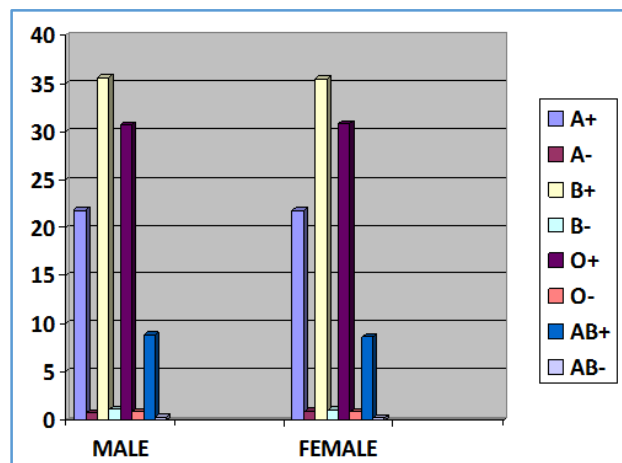


Figure 4. Distribution of Blood Group and Rh Type in Male and Female Donors

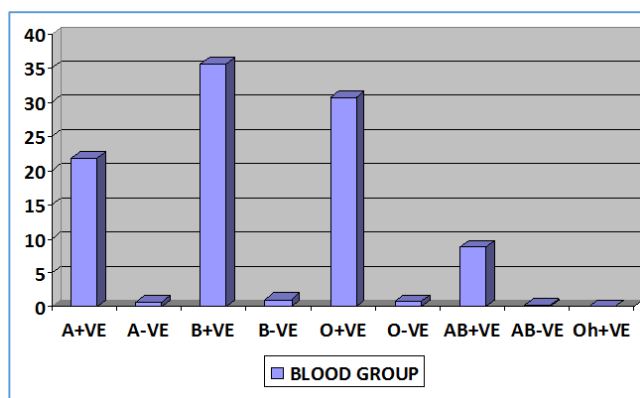


Figure 2. Percentage of Total Number of Blood Donors according to Blood Group

Rh +ve	97.04%
Rh -ve	2.96%

Table 3. Distribution of Rh Type in Total Donor Population

RESULTS

1. Distribution of ABO Blood Group and Rh type in Donor Population in the years 2007 – 09. During the study period from 2007 to 2009, amongst the blood donors, the most prevalent blood group was B +ve followed by O +ve, A +ve, AB +ve, B -ve, O -ve, A -ve and AB -ve respectively (Table 1 and Figure 1).
2. Distribution of ABO blood Rh type in total donor population- Total donor population documented within the period of 2007 and 2009 is (1,06,454 + 1,14,215 + 77,068) = 2,97,737. Distribution of blood group in the total population in the study period is similar (Table 2 and Figure 2).
3. Distribution of Rh +ve donors and distribution of Rh -ve donors in total time period is 2.96% and Rh +ve donors is 97.04% (Table 3 and Figure 3).

4. The distribution of blood groups in males and females is similar in all different blood groups. Percentage of each blood group is calculated over total male donor population and total female donor population respectively. For example, B +ve blood group is found to be 35.6% in males and 35.48% in females (Table 4 and Figure 4).

DISCUSSION

The distribution of blood group varies from race to race. Amongst the western Europeans 46% belongs to Group O, 42% belongs to Group A, 9% to Group B and 3% to Group AB. Some western Europeans show 40% of Group B amongst themselves. On the other hand some American Indians are exclusively Group O.⁽¹⁾ In the American population, the frequency of O, A, B, AB is 45%, 41%, 10% and 4%.⁽²⁾ 85% of white people are Rh positive, rest are Rh negative. 95% of American blacks are Rh +ve, whereas 100% of African blacks are Rh +ve.⁽³⁾ Caucasians 85% are Rh positive, Asians 99% are Rh positive.⁽²⁾ Rahman M et al found that amongst a total 78,768 blood donors (73,322 that is 93.1% of them were male and 5446 that is 6.9% were females). 94.1% males were Rh positive and 91.9% of females were Rh positive. The frequency of blood groups B, O, A, AB in Rhesus positive males were 32.4%, 30.5%, 22.6% and 8.6% respectively and in Rhesus positive females were 31.6%, 31.0%, 21.5% and 7.8% respectively. In Rhesus negative blood donors O, B, A and AB blood groups were 2.22%, 1.85%, 1.46% and 0.39% in males and in females it was 3.13%, 2.74%, 1.76% and 0.51% respectively. Thus, it can be concluded the donor population is predominantly Rhesus positive. The order of frequency of blood groups in Rh positive donors is B, O, A, AB and Rh negative donors O, A, B, AB respectively.⁽⁴⁾ Mathew Ebose Enosolease et al studied over twenty year period (1986 - 2005) a total of 160431 blood samples. These samples were grouped for ABO and Rh-D at the University of Benin Teaching Hospital, Benin City, Nigeria. Blood group distribution among these samples showed (phenotype) A, B, AB and O as 23.72%, 20.09%, 2.97% and 53.22% respectively. The Rh-D phenotype was found among 6.01% of samples tested. Mohammed Anees et al in DHQ Hospital, Mandi, Bahauddin, Province of Punjab. The study conducted from January to December 2005 on 2542 subjects (2097 were male and 427 were female). The study revealed predominance of Group B in order of B > O > A > AB as well as Rh-positive antigen for male is 0.894 and in female it is 0.9039.⁽⁵⁾ Tapas Pramanik et al concluded among 1310 Nepalese attending Tribhuvan University Teaching Hospital and Nepal Medical College, Kathmandu, the frequency of distribution of O, A, B and AB blood groups is 35.5%, 28.5%, 27.3% and 8.7% respectively. Only 0.8% of them were found to be Rh negative. Ada C Kopec has commented that the distribution of O blood group gradually increases in frequency from south to north of Great Britain, whereas

reverse is the case with blood group A.⁽⁶⁾ Jorge Omar Morales et al - 95,562 individuals, resident of 6 districts of north-west Argentina. Amongst them 66% belonged to O Group; 24% to Group A; 8% to Group B and only 2% to Group AB.⁽⁷⁾ Joshi SK et al found in his study population O +ve to be the most common blood group (31.9%) followed by A +ve, B +ve and AB +ve.⁽⁸⁾

Thus, this study helped us to detect the most prevalent blood group in blood donors of this region of the country.

CONCLUSION

In this study, blood donors donating blood at Institute of Blood Transfusion Medicine and Immunohaematology (IBTMI) are having their blood groups in the order of B +ve > O +ve > A +ve > AB +ve > B -ve > O -ve > A -ve > AB -ve respectively. 97.04% of blood donors are Rh factor +ve.

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