Int J Biol Med Res. 2024; 15(4): 7881- 7883

Contents lists available at BioMedSciDirect Publications

International Journal of Biological & Medical Research

Journal homepage: www.biomedscidirect.com

Original Article

Distribution of ABO, Rh blood groups among medical students in Nagpur region

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A R T I C L E I N F O

Keywords:
Blood group,
ABO,
Rhesus,
Rh +ve and Rh – ve.

A B S T R A C T

Background -Blood group system was discovered way back in 1901 by Karl Landsteiner. Clinically, only 'ABO' and 'Rhesus' groups are of major importance. 'ABO' system is further classified as A, B, AB and O blood group types according to presence of corresponding antigen in plasma. 'Rhesus' system is classified into 'Rh +ve' and 'Rh – ve' according to the presence or absence of 'D' antigen. ABO blood group distribution varies in different geographical, ethnic and socio-economic groups. So to determine the frequency of blood group distribution in Nagpur region present study has been carried out among 300 first year MBBS students at IGGMC, Nagpur. It is concluded that the most common blood group was B (44%) followed by O (30%), A (19.33%) and AB (6.67%). Amongst Rhesus (Rh) 95.66% were Rh+ve and 4.34% Rh-ve blood group.

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Introduction

A number of problems were encountered when blood transfusion were first attempted among men and animals alike. The first suggested case of blood transfusion was when Pope Innocent VIII was transfused in July, 1492 with blood donated by three volunteer youth, an action which later claimed lives of the donors and recipient. Nothing was known about blood group systems then.

The clinical relevance of ABO blood group antigens relate to the capacity to elicit the production of alloantibodies (both IgM and IgG) to cause destruction of transfused red cells or to cross placenta and give rise to haemolytic disease of the newborn.

In 1901, Karl Landsteiner reported a series of test that identifies ABO Blood Group System, which is known as the most clinically significant Blood group system till today .This is so because ABO antibodies are consistently, predictably, and naturally present in the serum of people who lack the antigen. ABO compatibility between donor and recipient is crucial. ABO system classified as A, B, AB and O blood group types according to the presence of corresponding antigen in plasma. 1,2 Thus strong, naturally occurring anti-A and anti-B are IgM and can readily activate complement and cause agglutination. If ABO antibodies react with antigen in-vivo, result is acute haemolysis and possibly death.

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In 1940, Rhesus (Rh) blood group was discovered by Landsteiner and Weiner. Rhesus system is classified into Rh positive and Rh negative according to presence or absence of 'D' antigen.

Blood grouping is required therefore for blood donors, transfusion recipients, transplant candidates and donors, prenatal patients, newborns and subjects for parentage dispute testing.

It is reported that the ABO blood group distribution varies in different geographical, ethnic and socio-economic groups. So to determine the frequency of blood group distribution in Nagpur region present study has been done.

MATERIALS & METHOD

300 first year MBBS students were studied at Indira Gandhi Government Medical College, Nagpur between September 2005 and June 2006. All the subjects used were above 18 years belonging to Nagpur region and gave their informed consents that their blood samples be used to generate information on frequencies of ABO, Rh antigens.

Under all aseptic condition ring finger of the subject was pricked. Few drops of blood were mixed with isotonic saline in test tube and subsequently blood group was determined by mixing with antisera on slide and observing for agglutination.

OBSERVATIONS

Table I shows the distribution of A, B, AB and O blood groups among the medical students. From the table it is evident that 45 % of the male students and 42 % of the females belong to B blood group whereas only 7 % of the males and 6 % of the females have AB blood group.

Overall, maximum 44 % of the study subjects belong to B blood group followed by O (30%) and A (19.33%) blood groups whereas AB blood group contributes minimum 6.67 % of the study subjects.

Table I. Distribution of A, B, AB and O blood groups.

Blood Group	Male		Female		Total	
	No.	%	No.	%	No.	%
A	34	17	24	24	58	19.33
B	90	45	42	42	132	44
AB	14	7	6	6	20	6.67
O	62	31	28	28	90	30
Total	200	100	100	100	300	100

Table II shows the distribution of Rh blood groups among the medical students. From the table it is evident that 96 % of the male students and 95 % of the females have Rh positive blood group whereas 4 % of the males and 5 % of the females have Rh negative blood group. Overall, maximum 95.66 % of the study subjects belong to Rh positive blood group whereas Rh negative blood group contributes minimum 4.34 % of the study subjects.

Table II. Distribution of Rh positive and Rh negative blood groups.

Blood Group	Male		Female		Total	
	No.	%	No.	%	No.	%
Rh +ve	192	96	95	95	287	95.66
Rh –ve	8	4	5	5	13	4.34
Total	200	100	100	100	300	100

DISCUSSION

Blood group system was discovered way back in 1901 by Karl Landsteiner. So far 19 major blood groups have been identified which vary in their frequency of distribution amongst various races of mankind. These include the ABO, Rhesus, MNS, Lutheran, Kell, Lewis, Duffy, Kid, Diego, Cartwright, Cotton, Sid, Scianna, Yt, Aubergen, Ii, Xg, Indian, and Dombrock systems.**[3,4]**

Clinically, only 'ABO' and 'Rhesus' groups are of major importance. 'ABO' system is further classified as A, B, AB and O blood group types according to presence of corresponding antigen in plasma. 'Rhesus' system is classified into 'Rh +ve' and 'Rh – ve' according to the presence or absence of 'D' antigen.

Table III shows the comparative study on frequency of ABO and Rh blood groups at different geographical areas (in percentage), discussed as below.

The studies done at Indore by Narendra Kumar et al [5]revealed B group to be the most common followed by O, A and AB. The same incidence is found in our study i.e. B was more frequent than O and followed by A and AB blood groups.

The studies done in Northern parts of India by authors like Tulika Chandra et al [6]at Lucknow, and by Sidhu et al [7]studies at Punjab, showed blood group B was the commonest, followed by O, A and AB; which is in consonance with present study.

In Western parts of India like in West Rajasthan by Behra R et al [8] Eastern Ahmedabad by Wadhwa MK et al [9]Western part of Ahmedabad by Patel, Piyush et al [10] and studies done at Surat by Nidhi et al[11], showed blood group B was the commonest followed by O, A and AB which is same as in our study.

Study done in Eastern part of India, Durgapur by Nag I et al [12] showed O group to be the commonest group which is different from our study.

In Southern part of India studies done by Periyavan A et al [13] at Bangalore, Das PK Nair et al [14] at Vellore, and at Davanagere by Mallikarjuna S et al[15] found that the commonest blood group was O followed by B, A and AB whereas our study showed commonest blood group B followed by O, A & AB.

Table III - Comparative study on frequency of ABO and Rh blood groups at different geographical areas (in percentage)

Place of study	A	B	AB	O	Rh +ve	Rh_ve
Present study	19.33	44	6.67	30	95.66	4.34
Indore [5]	24.15	35.25	9.10	31.50	95.43	4.57
Lucknow[6]	21.73	39.84	9.33	29.10	95.71	4.29
Punjab[7]	21.91	37.56	9.3	31.21	97.3	2.7
West Rajasthan[8]	22.2	36.4	9.4	31.7	91.75	8.25
Eastern Ahmedabad[9]	23.30	35.50	8.80	32.50	94.20	5.80
Western Ahmedabad[10]	21.94	39.40	7.86	30.79	95.05	4.95
Surat[11]	24.10	34.89	8.69	32.32	94.18	5.82
Durgapur (Steel City)[12]	23.90	33.60	7.70	34.80	94.70	5.30
Bangalore[13]	23.85	29.95	6.37	39.82	94.20	5.80
Vellore[14]	21.86	32.69	6.70	38.75	94.50	5.50
Devanagere[15]	26.15	29.85	7.24	31.76	94.8	5.2
Pakistan[16]	23.80	38	10	28.20	89.10	10.90
USA[17]	41	9	4	46	85	15
Nepal[18]	34	29	4	33	96.70	3.30

Geographical distribution of Blood Groups in India shows that in Central, Northern and Western part of India, B is the commonest blood group where as in Eastern, Southern part, O is the most frequently occurring blood group.

In Pakistan, the study done by Hammed A et al [16] the commonest blood group is B which is same as in our study. The study done in USA by Mollison PL et al[17] the commonest blood group was O, followed by A, B & AB, which is different from our study.

The study done at Nepal by Pramanik et al [18] found the commonest blood group was A, whereas the studies done in most parts of India the commonest blood group is either B or O followed by A and then AB.

The incidence of Rh+ve and Rh-ve blood groups in our study was found to be 95.66% and 4.34 %. Thus frequency of Rh +ve blood group was more which coincides with most of the other studies done as depicted in table III.

CONCLUSION

It is concluded that the most common blood group was B (44%) followed by O (30%), A (19.33%) and AB (6.67%). Amongst Rhesus (Rh) 95.66% were Rh+ve and 4.34% Rh-ve.
The study of distribution of blood group is very important for blood banks & transfusion services that could contribute to the patients health care.

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