

FREQUENCY AND DISTRIBUTION OF BLOOD GROUPS AMONG MEDICAL STUDENTS IN A TERTIARY CARE HOSPITAL OF NORTH EAST INDIA

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ABSTRACT

BACKGROUND

The ABO and Rhesus (Rh) blood group systems are clinically most important compared to other systems. Acquaintance of the geographical and ethnicity wise distribution of ABO and Rh blood group is necessary for operative management of blood banks, transfusion medicine and genetic research.

AIMS

This study was designed to collect data on ABO and Rh distribution among Assamese and its comparison with similar Indian studies.

METHODS

Study was accomplished on 84 first year local Assamese medical students in the Physiology Department of Silchar Medical College, Assam. The blood samples were collected by finger prick method. ABO blood grouping and Rhesus factors (Rh) typing were decided by glass slide method.

RESULTS

Among Assamese medical students, the maximum prevalent blood group was A (33.33%) followed by B (30.95%), O (25%) and AB (10.72%); 97.62% students were Rh positive.

CONCLUSION

The study authorises that blood group A is the commonest of the ABO blood group system in the Assamese population studied and the AB blood group is the least. Rhesus positive is much commoner than Rhesus negative in Assam.

KEYWORDS

ABO Blood Groups, Rh, Assamese, Medical Students.

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INTRODUCTION

ABO and Rhesus (Rh) blood group systems till today remain clinically most important in spite of being identification of around twenty nine blood group systems, enumerated by International Society of Blood Transfusion. In 1900, Karl Landsteiner detected the human ABO blood group.¹ The Rh blood group system was discovered during 1939–1940 by Landsteiner, Weiner, Levine and Stetson, clarifying the basis of many unpredicted transfusion reactions. In 1945, Coombs, Mourant and Race described the use of antihuman globulin (Coombs test) for incomplete antibodies.² Later, these two systems have substantiated to be the most important in transfusion medicine. Today, the requirement for blood group frequency and prevalence studies is multiuse, besides their importance in relative to blood transfusion and organ transplantation.

Blood group antigens can also be applied in genetic research, forensic pathology, anthropology and ancestral evolution of human.³

Nowadays, the ABO blood groups display an extensive geographical variation and vary noticeably both within and among ethnic groups. Hence, the knowledge of blood group distribution in diverse populace is of importance in health care and transfusion practices.⁴

Knowledge of blood group distribution is vital for clinical studies, for dependable geographical information and it will aid a lot in population genetic studies as access to safe supply of blood will help significantly in reducing the preventable deaths. Therefore, it is relevant to have statistics on the frequency distribution of these blood groups in any population group.

MATERIAL AND METHODS

This cross sectional observational study conducted over Assamese students at the Department of Physiology of Silchar Medical College, Assam, in the month of December 2015. After prior informed consent and institutional ethical clearance samples were collected from one hundred medical students, studying first professional MBBS. Among the students, 84% were from various territories of Assam, i.e. Barrack valley, Lower Assam, Upper Assam; and the rest 16% students were from various other states of India, i.e. West Bengal, Bihar and Meghalaya, etc.

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Students outside domicile of Assam were excluded from this study. Under a septic preventive measure by finger prick method, non-haemolysed blood samples were collected and emergency based glass slide or tile was used for identification of ABO blood grouping and Rhesus factors (Rh) typing. Commercially available Tulip diagnostics Eryscreen antisera A, antisera B and antisera D kits were used for this study. Blood samples were treated with anti-A, anti-B and anti-D antisera over glass slides and mixed uniformly over an area of 2.5 cm by mixing stick. After two minutes of gentle rocking samples were observed for agglutination, both macroscopically and microscopically.⁵

Following Landsteiner laws blood groups and IgG

antibodies of Rh system of those students were identified and relevant data were entered into Microsoft Excel sheet 2013 and tabulated with graphical representation.

RESULTS

Out of eighty four Assamese medical students, 47 (55.95%) were males and 37(44.05%) were females with mean±SD age of 18.95±0.85 years. In our study among 84 Assamese students most prevalent blood group was A, 28 cases (33.33%) followed by B in 26 cases (30.95%), O in 21 (25%) cases and AB in 9 cases (10.72%).

Blood Groups	Male (n=47)	Rh pos	Rh neg	Female (n=37)	Rh pos	Rh neg	Total
A	16	15	1	12	11	1	28
B	14	14	0	12	11	1	26
AB	6	6	0	3	3	0	9
O	11	11	0	10	10	0	21

Table 1: Frequency Distribution of Different Blood Groups among Medical Students from Assam

Among 84 Assamese students, 82 (97.62%) showed Rh positive blood group. In Rh-positive cases, among AB and O blood group all were Rh-positive followed by B (96.15%, n=25) and A (92.86%, N=26).

Among three 19 years Assamese Hindu Rh-negative students, two belonged to A blood group: Amid those Rh-negative students, two were female and one was male.

In that class there was 19 medical students, except one student (From Goa, ethnicity Konkani) all were from Assam. All local Muslim students showed Rh-positivity; B positive blood group was recorded on 8 cases followed by O positivity in 6 cases, A and AB positivity each in 2 cases.

The present study revealed among Assamese medical students, prevalence of blood group was A>B>O>AB. A study conducted by Talukdar et al. in the State of the Art Model Blood Bank, Gauhati, revealed blood group O was the commonest at 37.23% followed by blood groups B at 31.0%, A at 24.83% and AB at 6.93%.⁸

Studies done in Northern parts of India by Chandra et al. at Lucknow and Sindhu et al. at Punjab showed blood group B was the commonest followed by O, A and AB. In Western Ahmedabad, Patel et al. carried a hospital-based study predominantly among male donors and reported the commonest ABO blood was B (39.40%) followed by O (30.79%), A (21.94%) and AB (7.86%). In this present study among students from Assam the most prevalent blood group was A (33.33%) followed by B (30.95%), O (25%) and AB (10.72%). A study done in Durgapur of West Bengal by Nag et al. found that commonest blood group was O followed by B, A and AB, dissimilar to our study.^{9,10,11,12}

The present study pointed blood group A and B both were equal in distribution (12/37) (32.43%) and the maximum prevalent blood group among the female study group followed by the AB blood group (27.03%). Study done in North India by Chandra et al. displayed among female blood donors, the B positive blood group was most prevalent.⁹

A study carried on the distribution of blood groups among south Indian medical students of the Great Eastern Medical School, Andhra Pradesh, by Swamy et al. showed O was the commonest blood group in both sexes. But in this study among male students the commonest blood group was A and female students the maximum prevalent blood groups were A and B.¹³

The Rhesus blood group is the most polymorphic and its medical implication in transfusion medicine is only next to the ABO blood group system. Multicentric study in India by Agrawal et al. revealed 94.61% of the donor population was Rh positive and the rest were Rh negative, similar to present study where 97.62% students were Rh positive and rest 2.38% were Rh negative.

Blood Groups	Total No. (n=18)	Percentage	Male	Female
A	2	11.11	2	0
B	8	44.44	5	3
AB	2	11.11	2	0
O	6	33.34	3	3

Table 2: Frequency Distribution of Different Blood Groups among Assamese Muslim Medical Students

There were two Christian students with equal sex distribution and both were from Upper Assam. The 18 years male Christian student blood group was O positive and the 19 years female recorded O positive blood group.

DISCUSSION

Variables in ABO and Rh-D phenotypes are noted broadly across races and geographical boundaries.⁶ Limited studies on the prevalence of ABO and Rh blood groups have been conducted in the Indian population and common studies are limited to particular regions of the country. Very few such studies have yet been reported from North-East India.

In India, we have many types of ultra-rare phenotypes of blood groups like Bombay (Oh), -D-/-D-, in (a+b-) Colton-null phenotype, Cde/Cde (ryry) phenotypes; those phenotypes are potential enough to pose problems in providing blood to the recipients having these phenotypes.⁷

Study conducted by Parmanik et al. over Nepalese medical students, in Nepal Medical College, Kathmandu exhibited 96.66% Rh positive cases which was consistent finding with our study.^{14,15}

A study conducted by Hussain et al. among North Indian Muslim population highlighted the most frequent blood group was found to be group O 29.97%, followed by A₁ 26.52%, B 20.03%, A₁B 19.34%, A₂ 2.9% and A₂B 1.24%. Meitei et al. in their study in Manipur showed high occurrence of blood group O among Muslim population and they assumed it is due to practice of consanguinity among the Muslims. The overall phenotypic frequencies of in the present study was B>O>A=AB.^{16,17,18}

An epidemiological study in relation to Muslim and Christian communities of Kheda, Gujarat by Pant et al. showed blood group B was dominant in both the communities, but in present study among Christian students both A and O blood groups were prevalent.¹⁹

A study done over 152 medical students in Davangere, Karnataka by Hemlatha et al. published the most common blood group was O (41.5%) followed by B group (32.2%), A group (19%) and least being AB group (7.2%). Among the Rh blood group, 94% students were Rh positive, however only 6% were Rh negative. In this study among all one hundred medical students A, B and O blood groups were seen in equal proportion, each in 30% cases and least being AB group (10%) and ninety seven percentage students were Rh positive.²⁰

CONCLUSION

We noted that ABO and Rhesus 'D' blood group distribution diverged in different parts of India. The study highlights similar frequency of distribution of A, B and O blood group among students and A is the most prevalent blood group among Assamese population. Rhesus positive is much more common than Rhesus negative among Assamese population as well as in respect to Indian population. The knowledge of blood group distribution is important for clinical studies, for reliable geographical information and blood bank management. This study would help in developing India-specific reagent cell-panels for antibody screening and identification, which would further aid in the improvement of transfusion services in the country.

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