

Frequency of ABO and Rh blood groups and their combinations in peoples surrounding Ashiyan Medical College, Dhaka

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ABSTRACT:

Introduction: Among 35 blood group systems, we determine only ABO blood group and Rh (D) blood group, because of their greater clinical importance in transfusion immunology. Other groups are less important and usually are not determined routinely. In our country, frequencies of ABO blood groups and Rh blood groups were studied about 40 years ago by our renowned Prof. Dr. M Rahman. Although several studies were done later but little variation found. **Aims and Objectives:** The study was aimed to reevaluate previous data about the frequency of ABO and Rh blood groups, and to obtain their combined frequencies. **Methodology:** Ashiyan Medical College had arranged several free health camps in the nearby villages around hospital. We had done free blood grouping among 3797 people during the period from 20/03/13 to 28/02/16. As blood grouping was done in camps, slide method was applied by finger prick. **Results:** Of total 3797 people, male were 1717 (45.22%) and female 2080 (54.78%). Among them, Group A was 969 (25.52%), B was 1233 (32.47%), O was 1227 (32.32%) and AB was 368 (9.69%). Rh (D) positive were 3644 (95.97%) and Rh (D) negative were 153 (4.03%). These results were of little variation in comparison to previous data obtained previously (Rahman M et al 1978), where A group were 22.44%, B group were 35.20%, AB group were (8.39%) and O group 33.97%, and Rh (D) positive were 97.44% and Rh D negative were 2.56%. We got the combined frequencies of ABO and Rh blood groups as such: A positive 24.44%, A negative 1.08%, B positive 31.26% B negative 1.21%, AB positive 9.32 %, AB negative 0.37%, O positive 30.95%, and O negative 1.37%. **Conclusion:** Result of this very small scale study is apparently same as previous studies. Moreover, to get recent national frequencies of ABO and Rh blood groups and their combination, we need a large scale study including not only Bengali people but also all the ethnic and tribal groups of Bangladesh.

Key words: HTR, HD&F. ISBT.

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INTRODUCTION:

Blood is grouped according to the presence or absence of certain markers

(antigens) found on red blood cells and corresponding antibodies in the plasma that allow the body to recognize blood as its own.¹ The type of blood we have is

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based on the presence or absence of these antigens and antibodies in our blood. In other words, a blood group is a classification of blood based on the presence or absence of inherited antigenic substances on the surface of red blood cells and also on antibodies in the plasma.²

A total of 35 human blood group systems are now recognized by the International Society of Blood Transfusion (ISBT).³ Among these blood groups, ABO blood group system is the most important, because antibodies of this group (anti-A & anti-B) are found as naturally occurring in virtually all subjects who lack the corresponding antigens and these antibodies often cause intravascular hemolysis (hemolytic transfusion reaction- HTR) when incompatible red cells are transfused. Next important is the Rh blood group system, because D negative subjects readily forms anti-D and these antibodies are capable of causing HTR and hemolytic disease of the newborn and fetus (HDN&F).⁴ Other groups are less important and usually are not determined routinely.

ABO blood group system mainly includes four types: A, B, AB and O. Rh blood group system has many antigens, where D antigen is most antigenic and we usually determine D antigen. Other antigens of Rh system (C, c, E, e, etc.) are less antigenic and usually are not determined. If a person has D, his blood group is Rh (D) positive or simply positive (+). If D antigen is not found; he is Rh (D) negative or simply negative (-). In combination of these two

groups, we get eight blood groups such as A positive (A+), A negative (A-), B positive (B+), B negative (B-), AB positive (AB+), AB negative (AB-), O positive (O+) and O negative (O-).

The ABO and Rhesus (RhD) blood groups and the allelic frequency vary amongst the different population of the world. Blood groups vary with ethnicity, geographic area, race, population migration, natural selection and genetic phenomenon.^{5,6} In Bangladesh, majority people are of Bengali nation, although about 57 tribal groups are residing scattered throughout the country. They are Garo, Khasia, Monopuri, Chakma, Marma, Saotal, Tripura etc. Blood group frequencies of these minority tribal peoples are different from that of general Bengali peoples and studied less.^{6,7}

In our country, frequencies of ABO blood groups and Rh blood groups were usually studied separately. More than 40 years ago, our renowned Prof. M Rahman studied about their frequencies and got the results as A group- 22.44%, B group- 35.20%, AB group- 8.39% and O group- 33.97%; in Rh system: Rh (D) positive- 97.44%) and Rh D negative- 2.56%.⁸ Recently several studies were found where the results were apparently similar to that of M Rahman.^{5,9,10}

The study was aimed to re-evaluate the frequency of ABO and Rh blood groups and to find frequencies of their combinations.

METHODS AND MATERIALS:

This cross-sectional study was done during the period from 20/03/13 to

28/02/16 in the department of Transfusion Medicine of Ashiyan Medical College, Dhaka. Total 3797 people of different ages and sexes were included in this study. Ashiyan Medical College had arranged several free health camps in the nearby villages around hospital, where people came voluntarily and enrolled for free treatment. At the same time, free blood grouping also done. Forward grouping or cell typing was done after adding anti-A, anti-B and anti-D antisera (Biotec Laboratories, UK). As blood grouping was done in camps, slide method was used on samples by collecting blood through finger prick at the spot.

RESULTS:

A total of 3797 people came to us for determination of blood grouping in a number of 27 free health camps. Among them 1717 (45.22%) were male and 2080 (54.78%) were female (Table I).

Table II illustrates that among the respondents, people with A group belonged to 969 (25.52%), B group belonged to 1233 (32.47%), AB group belonged to only 368 (9.69%) and Rh group belonged to 1227 (32.32%). From this table, it is evident that majority i.e. 3644 (95.97%) of respondent were of Rh positive, and only 153 (4.03%) were of Rh negative.

Table I. Distribution of respondent according to sex (n=3797)

Sl no	Gender distribution	Numbers	Percentages
1	Male	1717	45.22 %
2	Female	2080	54.78 %
	Total	3797	100 %

Table II. Distribution of respondents' ABO blood groups in relation to Rh groups

Sl no	ABO Blood group	Rh Blood Group		Total (%)
		Rh positive (%)	Rh Negative (%)	
1	A	928 (95.77)(24.44)	41 (4.23)(1.08)	969 (100)(25.52)
2	B	1187 (96.27)(31.26)	46 (3.73)(1.21)	1233 (100) (32.47)
3	AB	354 (96.20)(9.32)	14 (3.80)(0.37)	368 (100)(9.69)

4	O	1175 (95.76)(30.95)	52 (4.24)(1.37)	1227 (100)(32.32)
Total		3644 (95.97)	153 (4.03)	3797 (100)(100)

*Parenthesis indicates percentages in column

As the **Table II** demonstrates separately the frequencies of ABO and Rh blood group system, at the same time shows the frequencies of their combination i.e. among total 3797 respondents, A positive (A+) were 24.44%, A- were 1.08, B+ were 31.26%, B- were 1.21%, AB+ were 30.95%, AB- 0.37%, O+ were 30.95% and O- were 1.37%. On the other hand, group wise distributions were: A positive (A+)- 928 (95.77%), A negative (A-)- 41 (4.23%); B positive (B+)- 1187 (96.27), B- 46 (3.73%); AB+- 354 (96.20%), AB- - 14 (3.73%); O+-1175 (95.76%) and O-- 52 (4.24%).

DISCUSSIONS:

In this study, the frequencies of different types of ABO blood group system were: A: 969 (25.52 %), B: 1233 (32.47 %), AB type: 368 (9.69 %) and O type: 1227 (32.32 %) which were little variation from the study done by M Rahman.⁸ Frequencies of Rh (D) blood group were: Rh (D) positive 95.97% and Rh (D) negative 4.03%; whereas study by M Rahman got Rh (D) positive 97.44% and Rh D negative 2.56%.

In this study, the combined frequencies of ABO & Rh blood groups were following: A+ were 95.77%, A- were 4.23%, B+ were 96.25%, B- were 3.73%, O+ were 95.76%, O- were 4.24%, AB+ were 9.72% and AB- were 9.15% which were concomitant with other several studies.^{9,10} Our study also showed

that A+ were 24.44%, A- were 1.08%, B+ were 31.26%, B- were 1.21%, AB+ were 30.95%, AB- 0.37%, O+ were 30.95% and O- were 1.37% which are concomitant with a study in BSMMU.¹¹

A study in India found the frequency of ABO and Rh systems: B- 39.92%, O- 29.27, A- 21.38, AB- 9.43 and Rhesus groups were Rh(D+)- 95.71 & Rh(D-)- 4.29% which is somewhat similar with our study.¹² In our study, the allelic frequency of ABO was: B>O>A>AB and India also possesses same frequency, but in USA the frequencies of A, B, AB and O groups are 41%, 10%, 4% and 45% respectively i.e. O>A>B>AB.¹³ The reason may be that the people of India and Bangladesh ethnically came from same origin but Americans are of different origin.

One study on Garo tribal people of Mymensingh revealed that there is significant variations in the distribution of ABO and Rh blood groups between Garo and Bengali peoples where among Garo: A was 36.9%, B was 31.1%, AB was 8.4%, O was 23.6%; Rh + was 99.1% and Rh- was 0.9%. Here the ABO frequency was A>B>O>AB.⁶

Several other studies on tribal people showed the following frequencies: Chakma- B>A>O>AB; Marma- B>O>A>AB; Tanchangya- B>A>O>AB, Tripura- A>B>AB>O: among all tribal groups, Rh+ was about 99% (among Tripura & Khasia, Rh+ is

100%) and Rh- 1-0.5%. AB blood group was the rarest in all tribal groups (exception is Tripura where AB is 21%), but higher than Bengali general people.^{6,7,14}

CONCLUSIONS:

The frequency of ABO and Rh blood group systems among the general Bengali people remains same as in our study and in the study by our renowned Prof. Dr. M Rahman. More and more such studies covering whole country including all our tribal groups are required to determine the same. Migration and infiltration of general people into the tribal areas and vice versa and increased social communications among different groups and communities made very difficult now to possess individual tribal identity. Yet, combinations of all these studies are needed to see distribution of ABO and Rhesus blood group system of whole Bangladeshi Nation.

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