

Comparison of ABO and Rh-D Blood Group Systems between the Garo Tribal People of Mymensingh and General People of Dhaka City

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Abstract

Background: The distribution pattern of ABO and Rh-D blood group in our country including the tribal people is not fully established as elaborated and large scale studies have not been carried out on it. Therefore this study was designed to observe the distribution pattern of ABO and Rh-D blood groups among the Garo tribes of Mymensingh and general people of Dhaka city. **Objectives:** To determine and to compare the distribution pattern of ABO and Rh-D blood groups among the Garo tribal people of Mymensingh and general people of Dhaka city and to compare this distribution between these two groups. **Materials and Methods:** This observational study was conducted in the Department of Physiology, Dhaka Medical College, Dhaka from July 2008 to June 2009. After proper ethical consideration total 900 Garo people of Mymensingh and 784 general people of Dhaka city were included in this study. The Garo localities and the general people of Dhaka city were selected by systematic random sampling. ABO and Rh-D blood groups were determined by the antigen antibody agglutination test of slide method. Chi square statistical analyses were done to compare the results of ABO blood group systems between the Garo people and general people of Dhaka city. **Results:** This study revealed that there are significant variations in the distribution of ABO and Rh-D blood groups between the Garo tribal people of Mymensingh and the general people of Dhaka city. In this study it was observed that blood group 'A' was apparently predominant in Garo population, while blood group 'B' was predominant in general population ($p < 0.001$), blood group 'AB' and 'O' were almost similar in both groups. Rh typing of the participants reveals that majorities of both groups were Rh positive. Rh negative persons are rare in both populations, but it is extremely rare in the Garo population (0.9%). **Conclusion:** From the findings of the present study it can be concluded that distribution of ABO and Rh-D blood groups varies between the Garo tribal people and the general people of Dhaka city.

Key words: ABO blood group system, Rh blood group system

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Introduction

Blood group or blood type is based on the presence or absence of inherited antigenic substance on the surface of red blood cells that can be determined by specific antibodies.¹ More than 600 surface antigens have been found on red blood cells and several of these antigens

that stem from one allele or very closely linked genes collectively form a blood group system.^{2,3}

The main blood group systems are ABO, Rhesus (Rh), Kell, MNs, Duffy, Kid & Lutheran. The Kell system is clinically the third most important blood

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group system after the ABO and Rhesus system.⁴ The major ABO blood group system is divided into four blood types on the basis of presence or absence of A and B surface antigens. The blood groups are A, B, O and AB. The frequency of four main ABO blood groups varies in population throughout the world. Great variation occurs in different groups within a given country, as one ethnic group mixes or not, with another. According to Guyton and Hall the relative frequency of A, B, O and AB in western European peoples are 46%, 42%, 9% and 3% respectively.⁵

The importance of blood group discovery lies in the transfusion of blood amongst different populations irrespective of their ethnic origin, in organ transplantation and in the development of legal medicine, genetic research and anthropology.⁶⁻⁸ At least 350 million people worldwide are considered to be indigenous.⁹ In Bangladesh about two million indigenous people of 57 different distinct communities are living throughout the country.¹⁰ These people with distinctive social and cultural practices, languages and customs are commonly known as "Adivasis" by themselves. They are scattered mainly in the hilly parts of Bangladesh.

The Garos, in Bangladesh are about 2 hundred thousand and distributed in greater Mymensingh, Rangpur, Sunamganj and Sylhet districts of Bangladesh. They are also found in Tripura, Assam and Meghalaya of India.¹¹

The distribution of ABO and Rhesus blood group systems among the people of central part of Bangladesh was first studied by Rahman M¹² in 1975, in the western part by Nandy CK¹³ in 1990, eastern part by Hussain M¹⁴ in 1990 and southern part by Khan GM¹⁵ in 1990.

The variation of ABO blood group frequencies is found even among the patients of two different hospitals of the same city. A comparative study of ABO blood group frequencies between the patients of IPGMR (BSMMU) and Mitford Hospital was done in 1992 and it was found that the frequency of 'O' group is higher (34.42%) among the IPGMR patients and 'B' group is higher (35.12%) among the patients of Mitford Hospital.¹⁶

A landmark study was conducted on ABO and Rh blood groups in six tribal groups of Bangladesh. The tribal groups were Manipuris, Khasias, Santals, Garos and different tribes of Chittagong Hill Tracts. A remarkable high frequency of group B was observed in the tribes of Chittagong Hill Tracts (40.11%) and Santal (38.83%). However the frequency was much lower among Manipuris (10.86%), Khasias (24.31%) and tea garden workers (28.4%). Both group O (41.75%) and group A (42%) were common types in Manipuris while only group O was common type in Khasias (47.37%). AB blood group was the rarest in all the tribes, however it was higher (13.78%) than in general population. The highest frequency of Rh-D negative individuals was 5.71% in Manipuris. However, the number of Rh-D negative persons was nil in Khasias, Garos and Santal tribes.¹⁷

All these studies give some preliminary ideas about the distribution of ABO and Rh blood groups among tribal people of our country. Garos were not studied separately and elaborately as a single tribal entity though they are one of the largest tribes distributed in about ten districts of Bangladesh, maximum in greater Mymensingh. Therefore, this study was designed to observe the distribution pattern of ABO and Rh blood groups in Garo people in Mymensingh.

Materials and Methods

This observational study was conducted among Garo people of Mymensingh and general people of Dhaka city during the period of July 2008 to June 2009. Samples of general population were taken from different blood donation programs in Dhaka city.

A total of 900 Garo people and 784 of general people irrespective of age and sex were included in the study. Samples were collected using random sampling technique. The sample size was calculated by the formula $n = z^2 \cdot p \cdot q / d^2$ with the help of computer program EPI info-6.

All the participants were explained about the aims and objectives of the study and the blood grouping procedures were briefed. Particulars of each participant were taken in a data collection sheet. Blood card was issued for all participants.

After aseptic washing with 70% alcohol, three drops of blood were collected on grease free clean slides from left ring finger tip with the help of a sterile lancet. The blood groups were determined immediately as described below.

- i. Determination of ABO blood group by slide method
- ii. Determination of Rh (D) blood group by slide method

All statistical analyses were done by SPSS software package 12 for windows. The result was calculated as frequency of each blood group and expressed as percentage. Chi square test was done to compare the results of ABO and Rh-D blood group systems between the Garo tribal people of Mymensingh and general people of Dhaka city.

Results

The mean age of the Garo tribal people was 20.8±13.8 years and general people was 25.9±14.5 years. The sex distribution demonstrates that males were somewhat lower than females in both groups (47.6% male and 52.4% female in Garo population and 45.4% male and 55.6% in female general population of Dhaka city).

ABO blood grouping

In the present study it was found that there is significant difference ($p < 0.001$) in ABO blood groups between the Garo people of Mymensingh district and the general people of Dhaka city. It was apparently observed that blood group 'A' was predominant in Garo population, while blood group 'B' was predominant in general population. Blood group 'AB' and 'O' were almost similar in both groups. Table I shows the comparison of ABO blood groups between Garo and general peoples.

Table I: Comparison of ABO blood groups between Garo and general peoples

ABO blood grouping	Groups		p-value
	Garo people	General people	
A	332 (36.9%)	184 (23.5%)	<0.001
B	280 (31.1%)	312 (39.8%)	
AB	76 (8.4%)	72 (9.2%)	
O	212 (23.6%)	216 (27.6%)	

Rh typing

In this study we found that there is significant difference ($p < 0.001$) in Rh blood groups between the Garo people of Mymensingh district and the general people of Dhaka city. It was observed that majorities of both groups were Rh positive. Rh negative was rare in both the groups, but it is extremely rare in the Garo population (0.9%) than in the general population (2.6%). Table II shows the comparison of Rh blood groups between Garo and general peoples.

Table II: Comparison of Rh typing between two groups

Rh typing	Groups		p-value
	Garo people	General people	
+ve	892 (99.1%)	764 (97.4%)	<0.001
-ve	8 (0.9%)	20 (2.6%)	

Discussion

The present study was conducted to determine and to compare the distribution pattern of ABO and Rh-D blood group systems in the Garo tribal communities of Mymensingh and general people of Dhaka city. This study revealed that there is significant variations in the distribution of ABO and Rh-D blood groups between the two groups.

Blood group was determined with simple and classic slide method which was also used in other published studies.¹⁷⁻²² The simplicity of the method has provided the screening of blood groups in large number of samples in short period of time. Other methods of blood grouping are test tube and microplate methods, though these are superior over slide method but not suitable in rural settings.¹

In the present study, it was observed that blood group A (commonest) and B (2nd most common) were the frequent blood groups among the studied Garo tribal groups and general population of Dhaka city. Group AB was the least frequent in both groups. In earlier studies Haque et al and Islam et al found A and O predominant distribution pattern of ABO blood groups in Manipuris tribal community.^{17,22} Among other tribal groups of Chittagong Hill Tracts and Santal, a remarkable high frequency of blood group B was observed.¹⁴ This study also shows, among the

general people blood group B is the commonest followed by O. However, in central region of Bangladesh, blood group B was more predominant though blood group O was found to be more frequent in South-East and Western parts of Bangladesh.¹¹⁻¹⁴

In this study, in Garo communities, frequency of blood group A is the highest. The distribution of A, B, O and AB were 36.9%, 31.1%, 23.6% and 8.4% respectively. Among the general people the distribution pattern of A, B, O, and AB were 23.5%, 39.8%, 27.6% and 9.2% respectively. This study revealed that the distribution pattern of ABO blood groups in Garo people of Mymensingh is significantly different from the distribution pattern of general people of Dhaka city ($p < 0.001$). Dissimilarity is also found among Bangladeshi population and other tribals of Bangladesh.^{12,14} Different ethnic and racial origin may be the cause behind it.

In the current study, highest frequency of blood group B is found in general people (39.8%) whereas in Garo people of Mymensingh blood group B is the second highest (31.1%) and blood group A is the highest (36.9%). The Rh-D negative blood group in the distribution by nation is least in all countries. In this study the Rh-D blood group in general people (2.6%) is also the least. But in this study the Rh-D negative blood group is only 0.9% in Garo people, which is comparable to Chinese population (0.69%)¹², but significantly different from that of general population of Dhaka city. The ethnic and racial origin of the Garo people and their general appearance are almost similar to the people of China.¹² These might be the cause of the above findings.

In the study conducted by Rahman M, the predominant ABO groups are B and O groups (35.2% & 33.97% respectively) while AB groups are minimum (8.39%).¹² These findings are almost similar to that of general people in current study where predominant ABO blood groups are B and O, but in Garo people A group is predominant. In both Garo and general people AB groups are minimum.

Regarding Rh-D blood group Rahman M found that Rh-D negative blood group is 2.56%¹² which is comparable to that of general population in this study (2.6%), but it is apparently different from that of Garo people (0.9%).

Regarding Rh-D blood group Rh +ve blood group is highly predominant throughout the country including the both groups of people in this study. But Rh -ve blood group is extremely rare in Garo people, which is only comparable to that of Chinese population (0.9% vs 0.69 %).¹²

This study revealed that there are significant variations in the distribution of ABO and Rh-D blood groups between the Garo tribal people of Mymensingh and the general people of Dhaka city.

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