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Original Article

Distribution of ABO Blood Group and Rhesus Factor Among Malay, Chinese, Indian and Other Races Students in Asia Metropolitan University, Malaysia

Sivananthan Manoharan

Department of Biomedical Science, Faculty of Biomedicine and Health, ASIA Metropolitan University

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ABSTRACT

Aim: This study was conducted to study the distribution of ABO blood group and Rhesus factor among Malay, Chinese, Indian and other races students in Asia Metropolitan University, Malaysia. **Method :** 428 students were involved in this study. They were divided into 4 different groups named as Malay, Chinese, Indian, Others. 107 students (male and female) were chosen randomly and being placed in each respective group. A 1.0-2.0 ml sample of blood was drawn from the antecubital vein of each subject in a disposable syringe, and transferred immediately to a tube containing ethylene diamine tetra acetic acid (EDTA). Blood grouping (ABO) and Rhesus factors (Rh), was done by the antigen antibody agglutination test. The anti sera used were obtained from Plasmatec Laboratory, Great Britain. **Result :** Blood group O was prevalent among Malay, Chinese, Other ethnics but among Indians blood group B was prevalent. Blood group AB was least prevalent. Among rhesus positive races, blood group O was prevalent and blood group AB was least prevalent. Among rhesus negative races, blood group B was prevalent and blood group A and AB were sharing the same percentage respectively that was 0.23%. **Conclusion:** Blood group O was most prevalent and blood group AB was least prevalent. When narrowly focused interestingly Indians were having blood group B as most prevalent but for Malay, Chinese, Others ethnics, blood group O were most prevalent. Another interesting finding was almost 67% rhesus negative were among the Indians and only 33% rhesus negative were distributed among Malay and Others ethnics with no rhesus negative were recorded for Chinese ethnic. From the present finding, Indians were having unique blood group distribution when compared to other ethnics live in Malaysia.

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1. Introduction

People have always been fascinated by blood, ancient Egyptians bathed in it, Aristocrats drank it, authors and playwrights used it as a theme and modern humanity transfuses it. Blood is man's complete and unchangeable identity. The regulation of ABO blood group system is under the control of ABO gene expression [1]. Several blood group system have been discovered but amongst the most important is ABO group [2].

In the ABO blood group, individual are divided into 4 major blood group, A, B, AB, and O according to the presence of antigens and agglutinins. Type A blood has type A antigens, type B blood has type B antigens, type AB blood has both type A and B antigens and type O blood has no A or B antigens. In addition plasma from type A blood contain type B antibodies, which act against type B antigens. Plasma from type B blood has type A antibodies which act against type A antigens. Type AB has neither type of antibodies and type O blood has both type A and B antibodies [3]. Some of the blood group system beside "ABO" and "Rh" are MNS, P, Kell, Kidd, Duffy, Lutheran systems [4].

ABO and Rh genes and phenotypes vary widely across races and geographical boundaries. ABO blood groups hold a respectable position in view of the safety of blood/blood products

* Corresponding Author : **SivananthanManoharan**

Faculty of Biomedicine and Health,
ASIA Metropolitan University,
G-8, JalanKemacahaya 11, Taman Kemacahaya, Batu 9,
43200 Cheras, Selangor, Malaysia.PIN- 43200
Phone: +600169534735
E mail: siva8905@gmail.com

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transfusion to date. The knowledge of the distribution of ABO and Rh blood groups is essential for effective management of blood banks inventory, be it a facility of a smaller local transfusion service or a regional or national transfusion service [5].

Distribution of blood groups varies among ethnic groups throughout the world. According to a researcher who has conducted blood grouping research in Bangladesh, blood groups of tribals should be determined as they are ethnically different from the main population of Bangladesh [6].

Apart from their importance in blood transfusion practice, the ABO and Rh blood groups are useful in population genetic studies, researching population migration patterns, as well as resolving certain medico-legal issues, particularly of disputed parentage. It is, therefore, imperative to have information on the distribution of these blood groups in any population group [5].

Karl Landsteiner was the first person to put forward the ABO blood group system in 1900. After 40 years (1940-1941), Landsteiner and Wiener discovered that blood group antigens could be recognized with specific antisera and a vast number of antigens have been detected on human blood cells, of which about 10-15% from well-defined systems and only 1-2% play a significant role in blood transfusion. Blood grouping has improved with the advent of monoclonal antibodies and the automation of tests. Although different advanced techniques, such as micro plate method, PCR based, FMC based typing, mini sequencing analysis, fluorescent immunomicroplate technique, sandwich ELISA method, etc., for ABO geno-typing are available, but manual method has its own significance not only in blood typing but also measuring its genotypic frequency by Hardy-Weinberg Law, with no additional costs in the areas with limited access to advance/automated techniques [7].

Some studies have also reported their association with certain pathological conditions for example a higher prevalence of stomach cancer among people with blood group A[8]. Among the first epidemiological studies to establish associations between the blood groups and the diseases, there were some manifestations of high frequencies of the O blood group and non-secretor phenotype of ABO antigens in patients suffering from peptic ulcers [9]. Blood group O is a risk factor for duodenal ulcer. Blood group B has highest frequency of Diabetes Type II, since diabetes is common in our population, persons with blood group B who are at high risk should have screening for diabetes earlier than normal population [10].

Malay, Chinese, Indians are the three major ethnics live and distributed widely in Malaysia. Together with these ethnics there are few other ethnics live in peninsular Malaysia, Sarawak and Sabah (mostly Sabahan and Sarawakian). This study was conducted to determine the distribution of ABO blood group and rhesus factor among Malay, Chinese, Indian and other races students in Asia Metropolitan University, Malaysia. ASIA Metropolitan University is

located in Cheras, Selangor, Malaysia. Students in ASIA Metropolitan University are came from different ethnicity and different geographical locations (North, South, East, West Malaysia).

2. Material and methods

428 students were involved in this study. They were divided into 4 different groups named as Malay, Chinese, Indian, Others. 107 students (male and female) were chosen randomly and being placed in each respective group.

A 1.0-2.0 ml sample of blood was drawn from the antecubital vein of each subject in a disposable syringe, and transferred immediately to a tube containing ethylene diamine tetra acetic acid (EDTA). Blood grouping (ABO) and Rhesus factors (Rh), was done by the antigen antibody agglutination test. The anti sera used were obtained from Plasmatec Laboratory, Great Britain [7].

3. Results

From the table 1, among Malay, Chinese and Others, blood group O was dominant but blood group B was dominant among Indians. 39 Malay students, 38 Chinese and 38 Others students were having blood group O as dominant but 41 students were having blood group O among Indians and make it non dominant blood group among Indians because 43 students were having blood group B. Although blood group O is second dominant among Indians, but compare to other ethnics, Indians were having higher number of blood group O. Indian (41) > Malay (39) > Chinese (38) = Others (38). Blood group B were second dominant among Malay, Chinese, Others but dominant among Indians. Indian (43) > Others (33) > Malay (32) = Chinese (32). Blood group A were third dominant with Chinese were having students with more blood group A and the least were Indians. Chinese (31) > Others (26) > Malay (23) > Indian (14). Blood group AB was non dominant with Malay having higher number of students and least number of students were Chinese. Malay (13) > Others (10) > Indian (9) > Chinese (6).

Table 1: ABO and rhesus blood grouping

Bloodgroup	Races			
	Malay	Chinese	Indian	Others
A	23	31	14	26
B	32	32	43	33
O	39	38	41	38
AB	13	6	9	10
Rhesus				
+ve	106	107	101	105
-ve	1	0	6	2

In case of rhesus factor, rhesus positive was dominant and rhesus negative was non dominant. 419 students were rhesus positive and 9 students were rhesus negative. Out of these digits, all 107 Chinese students were rhesus positive followed by Malays (106), Others (105) and least were Indians (101). Although rhesus negative were very less with only 9 students but out of these 9 students, 6 were Indians with 2 Others, 1 Malay and none of Chinese students were having rhesus negative blood group. Overall blood group O was dominant and blood group AB non dominant. O (156) > B (140) > A (94) > AB (38).

From the table 2, among the rhesus positive races, blood group O was found to be more prevalent with Indians are having highest percentage 9.58% followed by Malay with 9.11%, Chinese with 8.88% and Others with 8.41%. Blood group B was second prevalent with Indians were having highest percentage with 9.11% followed by Others 7.71%, Chinese 7.48% and Malay 7.24%. Blood group A was third prevalent with Chinese were having highest percentage with 7.24% followed by Others 6.07%, Malay 5.37% and Indians with 3.04%. Blood group AB was least prevalent with Malays were having highest percentage with 3.04% followed by others with 2.34%, Indians with 1.87% and Chinese 1.40%. Overall O > B > A > AB.

Among the rhesus negative races, blood group B was most prevalent with Indians were having highest percentage with 0.93% followed by Malays 0.23%. Neither Chinese nor Others were having this blood group. Blood group O was second prevalent with Others were having highest percentage with 0.47%. Malay, Chinese, Indians were not having this blood group. Blood group A and AB were sharing the same percentage respectively that were 0.23% with Indians in these category and none of other ethnics were having these type of blood groups. Overall B > O > A = AB.

Table 2: Frequency distribution of ABO and Rh blood groups among study population

Bloodgroup	Races			
	Malay (%)	Chinese (%)	Indian (%)	Others (%)
A+	23 (5.37)	31 (7.24)	13 (3.04)	26 (6.07)
B+	31 (7.24)	32 (7.48)	39 (9.11)	33 (7.71)
O+	39 (9.11)	38 (8.88)	41 (9.58)	36 (8.41)
AB+	13 (3.04)	6 (1.40)	8 (1.87)	10 (2.34)
A-	0 (0.00)	0 (0.00)	1 (0.23)	0 (0.00)
B-	1 (0.23)	0 (0.00)	4 (0.93)	0 (0.00)
O-	0 (0.00)	0 (0.00)	0 (0.00)	2 (0.47)
AB-	0 (0.00)	0 (0.00)	1 (0.23)	0 (0.00)

4. Discussion

Rhesus system become the second most important blood group system due to hemolytic disease of newborn and its importance in RhD negative individuals in subsequent transfusion once they developed Rh antibodies. Rh incompatibility can pose a major problems in some pregnancies when the mother is Rh negative and the foetus is Rh positive. If foetal blood leak through placenta and mixes with the mother's blood, the mother become sensitized to the Rh antigens. The mother produce Rh antibodies that cross the placenta and cause agglutination and hemolysis of foetal erythrocytes. This disorder is called Haemolytic disease of newborn (HDN) or erythroblastosis foetalis and it may be fatal to the foetus [3].

Populations of the United States, Asian, Syrian Arabs and Palestinians, group O is dominant, with AB being the rarest, while in Saudi Arabia the prevalence of blood group A is higher as compared to the Pakistani population, where the blood group B is more prevalent [7]. In the present study, blood group O was dominant in all ethnics except Indian where blood group B was dominant. This sharp difference among the blood groups distribution may be due to geographical variations, external environment and genetic factors involved [7]. In many Asian populations, there is an increase in the prevalence of group B, example in India and Malaysia [11]. This statement supporting the present finding where Indians in Malaysia were having blood group B as dominant blood group.

According to a research conducted in India in 2012, among Rh positive and negative males and females, blood group B was the commonest [12]. This statement again supporting the present finding. Compared to other ethnics, Indians were having highest number of rhesus negative with B was the most prevalent. Blood group B+ (9.11%) was having a narrow gap (0.47%) with blood group O+ (9.58%) with O+ was the most prevalent for rhesus positive among Indians.

In a separate research conducted by Malaysian researchers from University Sains Malaysia (USM) in the year of 2010, they had reported that among Indians, blood group B was the most dominant and this statement again supporting the present findings [13].

5. Conclusion

Overall blood group O was most prevalent and blood group AB was least prevalent. When narrowly focused interestingly Indians were having blood group B as most prevalent but for other ethnics, blood group O were most prevalent. Another interesting finding was almost 67% rhesus negative were among Indians and only 33% rhesus negative were distributed among Malay and Other ethnics with no rhesus negative were recorded for Chinese ethnic. From the present finding, Indians were having unique blood group distribution when compared to other ethnics live in Malaysia.

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