



Frequency Distribution of ABO, & RH Blood Group Amongst Medical Students in SKNMC & GH, Pune

KEYWORDS

Blood groups, ABO, Rh Typing , Medical students

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ABSTRACT *Background: Apart from blood transfusion practice, knowing of the ABO and Rh blood groups are useful in population genetic studies, researching population migration patterns as well as resolving certain medico legal issues.*

Objectives :This study was intended to demonstrate the the frequency of ABO blood groups among medical students.

Material & Methods: The observational study was done in Physiology at SKNMC & GH, Pune of Maharashtra . Blood group subjects was determined by routine slide method. Results of agglutination observed & confirmed under microscope.

Results: In all 412 were the subjects (213 males& 199 females). Study showed Blood group O was more predominant in both & B is equally distributed in them.

Conclusions: In both male and females the most frequently occurring ABO blood group was O (33.73%), followed by B (30.58 %), A (26.21%), and AB (9.70%). Rh positive seen in 91.50% o & Rh negative 8.49% in our study group .

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 it¹. The date of 1901 represents the most important achievement in the history of blood transfusions through the discovery of the ABO blood groups by Karl Landsteiner². Forty years later both Landsteiner & Weiner discovered Rh (D) antigen. The genes of ABO and Rh (D) are located on Chromosome nine and one respectively. The antibodies against red blood cell antigens are called agglutinins and individuals are divided into four major blood groups A, B AB & O, according to the presence of these antigens & agglutinins³. The membranes of important and best known of these are the A and B antigens. Type B has the B antigen, type AB has both, and type-O has neither⁴. These antigens are found in many tissues in addition to blood; these include salivary glands, saliva, pancreas, kidney, liver, lungs, testis and amniotic fluid⁵. Type A and B antigens are actually complex oligosaccharides that differ in their terminal sugar. On red cells there are mostly glycosphingo lipids, where as in other tissues there are glyco proteins^{3,4}. The ABO and Rh blood group systems are the most commonly utilized grouping systems in blood transfusion. These systems also play an important role in transplantation hereditary diseases, genetics and in determining migration of races. The association of different blood groups with the diseases is important as some of the blood groups are particularly prone to developing certain diseases⁶, like it was found that carcinoma of cervix had higher frequency in blood group A. Blood group antigens are also marker of cancer. AS the majority of the human cancers are derived from epithelial cells^{7,8}. The particular type of blood group a person inherits depends on the genes that encode for the blood grouping system, the frequency of distribution of the genes varies and their blood groups reveal important information in forensic evidence⁶. The reaction of mismatched transfusions, it is important to determine the blood groups of those involved prior to transfusions. Now a days to eliminate the risk of transfusion reaction, donor blood is matched with the recipients before transfusions. Blood transfusion is major development in medicine as it is life saving measure in management of verities of medical and surgical conditions at first human-to-human transfusion in 1918⁹. Blood transfu-

sions among human irrespective of their natives, unmatched pregnancy legal medicine, anthropology and the discovery of other blood group systems, all are deemed as an applications are as a result of Karl discovery .

MATERIAL AND METHODS

The study was conducted in the department of physiology, SKNMC & GH, Pune, Maharashtra of India. Among randomly selected 412 subjects between the age group of 18 to 22 years. Subjects which were non residents of India excluded. Informed consent was taken prior to the procedure. All the subjects included in the present study were healthy and free from diseases. ABO blood group was determined by conventional glass slide method. ABO blood grouping was carried out by two methods using commercially prepared anti sera; anti A, Anti B and anti AB for the direct grouping and reagent cells. Presence of Rh (D) antigen was determined by Anti D.

Procedure: For the test a drop of each of the anti sera, anti A anti B and anti D were placed on glass slide. Blood cells from each subject were mixed with each serum individually, with the help of the separate glass rods. Then Blood groups were determined on the basis of agglutination. The blood group was confirmed by observing the agglutination under microscope.

OBSERVATION AND RESULTS

The results illustrated in table 1,2 and 3. It is found that 51.69% of our students (213 out of 412) were males and 48.30 % (199 students) were females. In table 1 , it was observed that in both male and females the most frequently occurring blood group was O (33.73%), followed by B (30.58 %), A (26.21%), and AB (9.7%). Rh positive seen in 91.50% of the students. Only 8.49 % of the students in our study group were Rh negative. We observed from table 3 , Rh positive is the commonest in both males and females and also showed slightly incidence of Rh negative more in males (nineteen cases in males and sixteen cases in females among the study group of 412). The complete analysis of ABO group and Rh type of all the students in the study group is illustrated in table 2. It was observed that O positive was the commonest group in both sexes. Followed by B positive and A positive. Interesting finding of our study is B blood group is equally distributed amongst male and female subjects. And even B

positive & B negative blood group is also equally distributed in study group. A B positive least common one. AB negative was more common in males (two cases in males and one case in females) in our study group. We compare the traits of blood group in India and outside India amongst same study group in table 3. It is found that our study shows same

trend as found in other two studies done in India in two other states. The difference found in distribution when we compare our study internationally with study done in Pakistan and Gaza Palestine. This will help us to map the genetic distribution of blood groups all over the world.

Table 1 : Blood Group frequency & distribution

Number of cases (%)						
Sex	O	B	A	AB	Rh+ve	Rh - ve
Male (n=213)	67 (31.45%)	63 (29.57%)	61 (28.63%)	22 (10.32%)	194 (47.08%)	19 (4.61%)
Female (n=199)	72 (36.18%)	63 (31.65%)	46 (23.11%)	18 (09.04%)	183 (44.41%)	16 (3.88%)
Total (n=412)	139 (33.73%)	126 (30.58%)	108 (26.21%)	40 (09.70%)	377 (91.50%)	35 (8.49%)

Table 2. Complete analysis of ABO group and Rh type of all the students in the study group

Blood group	Male		Female	
	Subjects	Percentage	Subjects	Percentage
A + ve	59	27.69%	40	20.10%
A- ve	02	0.93%	06	03.01%
B + ve	58	27.23%	58	29.14%
B - ve	05	2.34%	05	02.51%
O+ve	57	26.76%	68	34.17%
O-ve	10	4.69%	04	02.01%
AB+ ve	20	9.38%	17	08.54%
AB-ve	02	0.93%	01	00.50%
Total	213	100%	199	100%

Table 3: Incidence of ABO and Rh blood groups types amongst the students at different geographical areas (in percentage)

Place of the study	A	B	AB	O	Rh+ve	Rh-ve
a) Within India						
Andhrapradesh	17.1	29.7	6.3	46.9	94.85	5.1
Karnatka	20	35	6.5	36	94.67	5.33
Our study	25.97	30.58	9.71	33.74	91.49	8.49
b) Outside India						
Nepal	35	28.9	5.5	35.2	-*	-*
Pakistan	31.3	42.1	6.7	29.9	-*	-*
Gaza Palestine	39.5	22.0	5.8	30.34	-*	-*

*readings not available for comparison.

DISCUSSION

The membrane of a human red blood cell contains a variety of blood group antigens, the most important and best known of these are A and B antigens. The Rh blood group system is the second most important in blood transfusions¹⁰. It has been observed that percentage of blood group distribution in different parts of the world is different depending upon the ethnic origin of the races¹¹. South African Indians all belong to group 'O'. The commonest groups in Australian origins are 'O' and 'A'. In Europeans there is a higher frequency of A, while in Africans B group is much common. In the United States of America, 46% constitute group O, 41% A, 9% B and 4% AB¹¹. Present study shows that commonest ABO blood group in both sexes was 'O' group followed by B, A & AB groups. The frequency of Rh +ve was about 91.49% while almost 8.49% was Rh -ve. Similar study was done earlier in

other two states India^{12,13}. Our findings are consistent with both the studies. We found the distribution of ABO blood groups in India according to the maps displayed on the website¹⁴, which were kept here and showed. According to these maps, 60-70% Indians seem to have O blood group, 10-30% seem have B blood group and 15-25% seem have A blood group. (AB blood group is known to have least prevalence, though it is not shown in the maps). According to these maps, prevalence of blood groups in Indians in descending order seems to be as follows: O>B>A>AB, which is similar to our findings. Comparison study on frequency of ABO and Rh phenotypes at different geographical areas^{15,16,17} amongst the same study group is shown in the Table V.

CONCLUSION AND SUGGESTIONS

1. The present study concludes that 'O' blood group is the commonest blood group amongst the medical students at medical college situated at southern part of India. This is followed by 'B', 'A' and 'AB' blood group respectively.
2. Regarding Rhesus blood group system, Rh positive donors were 91.49% and Rh negative were 8.49%.
3. The present study has a significant implication regarding the management of blood bank & transfusion service in this area. Knowledge of blood group distribution is also important for clinical studies for reliable geographical information and for forensic studies. The different types of information's are useful for medical diagnosis, genetic information, genetic counselling and also for the general well-being of individuals.
4. Studies on frequency and distribution of Blood Groups among residents of various states and races in our country are inadequate. It is necessary to conduct similar well designed studies in other states and races of India in order to determine the blood group frequencies in them. The data generated in the present study and several other studies of different geographical region of India will be useful to health planners while making efforts to face the future health challenges in the region.

Declaration on conflict of interest : Nil

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