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Research Article

FREQUENCY & DISTRIBUTION OF ABO AND Rh (FACTOR) BLOOD GROUPS AMONG MEDICAL STUDENTS OF CENTRAL INDIA, REWA, MADHYA PRADESH

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ABSTRACT

This study was conducted in the department of Physiology at S.S. Medical College, Rewa, MP with Aim to determine the frequency and distribution of "A, B, AB, O and Rh" blood groups among medical students and aware them to blood groups related diseases, between December 2012 to March 2013, total 223 students were enrolled, blood samples were collected by finger prick method. A drop of Anti-sera A, B, and Anti D were added to a drop of blood on clean and fresh glass slides and mixed well with glass rod. Of these 223 students, 137 males and 86 were females. Result shows the blood group B was the most predominant (39.46%) followed by O (29.59%), A (20.62%) and AB (10.31%), of them 95.06% had Rh positive blood group. Group B was the commonest blood group in both males and females students 37.95% and 41.86% respectively; Rh group (antigen) was positive (+ve) in 93.43% of males and 97.67% females, in this study we concluded that group 'B' is the commonest blood groups among both male (37.95%) and female (41.86%) medical students.

Keywords: Blood groups, ABO, Rhesus factor and Medical students.

INTRODUCTION

Blood group antigens are hereditary determined and play a vital role in transfusion safety, understanding genetics, inheritance pattern, and disease susceptibility. Nearly 700 erythrocyte antigens are described and organized into 30 blood group systems by the International Society of Blood Transfusion.[1] The first blood group antigen was recognized in 1900 by the Austrian scientist Karl Landsteiner, who found three different blood types, it was A, B, O; for which he was awarded the Nobel prize in 1930.[2] Alfred Von Decastello and Adriano Sturli discovered the fourth type, AB in 1902.[3] Since 1901, more than 20 distinct blood group systems have been characterized but the ABO and Rhesus (Rh) blood groups remain the most clinically important.[4] Forty years later both Landsteiner & Weiner discovered Rh (D) antigen. The red blood cell membranes have important and best known antigens; of these are the A and B antigens. Type A has the A antigen,

type B has B antigen, type AB has both, and type-O has neither antigen,[5] these antigens are found in many tissues in addition to blood; these include salivary glands, saliva, pancreas, kidney, liver, lungs, testis and amniotic fluid.[6] The antibodies against red blood cell antigens are called agglutinins and individuals are divided into four major blood groups A, B, AB & O, according the presence of these antigens and agglutinins.[7] Type A and B antigens are actually complex oligosaccharides that differ in their terminal sugar. On red cells there are mostly glycosphingolipids, where as in other tissues there is glycoproteins.[7,5] The genes of ABO and Rh (D) are located on Chromosome nine and one respectively.[8] All human populations share the same blood group systems; although they differ in the frequencies of specific types. The incidence of ABO and Rh groups varies markedly in different races, ethnic groups, and socio-economic groups in different part of the world.[6] The frequencies of ABO and Rh blood groups vary from one population to another and time to time in the same region. The knowledge of distribution of ABO and Rh blood groups at local and regional levels are helpful in the effective management of blood banks and safe blood transfusion services. Identification of Rh system is important to prevent the erythroblastosis fetalis; which commonly arises when an Rh negative mother carries an Rh positive fetus.[9] The association of different blood groups with the diseases is important as some of the blood groups are particularly prone to developing certain diseases[10], like it was found that carcinoma of cervix had higher frequency in blood group "A".

MATERIAL AND METHODS

The present observational cross sectional study was carried out in the Department of Physiology, SS Medical College and associated SGM Hospital, Rewa, MP, India, from December 2012 to March 2013. Total 223 medical students were enrolled in study; they are from first to final year students. Written informed consent was taken prior to the procedure. All the subjects included in the study were 18 to 24 years of age group, healthy and free from diseases. ABO blood groups were determined in physiology lab by conventional glass slide method. Blood samples were collected by finger prick with a sterile lancet after cleaning the puncture site with 70% ethyl alcohol. Serological phenotyping was performed mainly by the procedure of forward typing in which a blood drops was mixed with anti-A, anti-B and anti-D anti-sera (Span Diagnostic Ltd., Surat, Gujrat). 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 drops from each subject were mixed with each serum individually with the help of the separate glass rods. The blood groups were determined on the basis of agglutination.

OBSERVATION AND RESULTS

The results of ABO blood groups in students are shown in table 1. Both in male and female students; the B group was the more predominant followed by O, A and AB group. The frequency of A, B, AB and O groups in total students were 20.62%, 39.46%, 10.31% and 29.59% respectively, Among the female students frequency of A, B, AB and O groups were 17.44%, 41.86%, 8.13% and 32.55% respectively, In males; contrast to females A, B, AB and O frequency was 22.62%, 37.95%, 11.67% and 27.73% respectively. shown in table 1

Table 1: Distribution of ABO blood groups among medical students

SN	Sex	Male		Female		Total	
	Blood groups	Subjects	Percentage	Subjects	Percentage	Subjects	Percentage
1	A	31	22.62 %	15	17.44 %	46	20.6 2%
2	B	52	37.95 %	36	41.86 %	88	39.46 %
3	AB	16	11.67 %	7	8.13 %	23	10.31 %
4	O	38	27.73 %	28	32.55 %	66	29.59 %
	Total	137	100 %	86	100 %	223	100 %

Out of 223 students only 4.93% had Rh negative and rest 95.06% had Rh positive group. Among the female students frequency of Rh groups were; 97.67 % had Rh(+)ve and only 2.32% female students had Rh (-)ve group. In males; 93.43% had Rh (+) ve and 6.56% subjects had Rh (-)ve group as shown in table 2.

Table 2: Distribution of Rh factor among medical students

SN	Sex	Male		Female		Total	
	Rh FACTOR	Subjects	Percentage	Subjects	Percentage	Subjects	Percentage
1	Positive	128	93.43 %	84	97.67 %	212	95.06%
2	Negative	09	6.56 %	02	2.32 %	11	4.93%
	Total	137	100 %	86	100 %	223	100 %

The results revealed that blood group B was predominant among both male and female students in decreasing order as follow B > O > A > AB.

Table 3: Distribution of ABO and Rh Factor among medical students

S.N.	Sex	Male		Female		Total	
	Blood groups & Rh Factor	Subjects	Percentage	Subjects	Percentage	Subjects	Percentage
1	A+	30	21.89 %	15	17.44 %	45	20.17 %
2	A-	01	0.72 %	00	NIL	01	0.44 %
3	B+	46	33.57 %	34	39.53 %	80	35.87 %
4	B-	06	4.37 %	02	2.32 %	08	3.58 %
5	AB+	16	11.67 %	07	8.13 %	23	10.31 %
6	AB-	NIL	NIL	NIL	NIL	NIL	NIL
7	O+	34	24.81 %	28	32.55 %	62	27.80 %
8	O-	04	2.91 %	00	NIL	04	1.73 %
	Total	137	100 %	86	100 %	223	100 %

DISCUSSION

The need for blood group prevalence study is not only important for transfusion medicine but also for organ transplantation and genetic research. Knowledge of frequency of ABO Blood Groups are an important tool to determine the direction of recruitment of voluntary donors as required for each zone across the country. 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 races.[11] In our study the group B was the commonest blood groups among medical students, this was dissimilar to South African Indians (in which all belong to group O), Australian aborigines ('O was the commonest groups) and in Europeans (group A was occurs in higher frequency), while it was similar to Africans in which B group was much commoner.[12] the results of our study were dissimilar to many other studies likes in the United States of America, 46% constitute group O, 41% A, 9% B and 4% AB, and a study in IRAN show O group is commonest (41.16%) blood group[13,14] while the present study showed the same trend of ABO distributions as seen in our previous study[15] in the general central Indian populations (B ≥ O > A > AB). The blood group frequency in males and females are similar in entire population group, because blood groups are autosomal, thus frequencies are not different in the two sexes. In our study nearly 4.93% students was Rhesus negative compare to 17% in UK.[16,] the distribution of Rhesus group in present study was 95.06%; while its frequency in the English population is 95%. In US, 85% belong to Rh +ve group; while in Saudi Arabia 93% are found to be Rh +ve. In Iran 90% are found to be Rh +ve. The frequency of Rh +ve was 95.06% and Rh –ve was 4.93% in present study; this distribution was different among general population as in our previous study[15], in which 97.52% Rh +ve and only 2.47% subjects have Rh –ve blood group. While looking at Rh grouping, 89-95 % donors all over the world are detected as Rh+ve except at Britain and U.S.A. where the frequency of Rh positivity is 83–85%[1]. Significant implications of present study is provides information regarding safe transfusion, apart from transfusion service, knowledge of the blood group system helps to take preventive measures against the diseases which are associated with different blood groups, as well as resolving certain medico-legal issues, particularly of disputed paternity cases. Blood group O is a risk factor for duodenal ulcer.[16] individuals have O' group reduced 14 % risk of squamous cell carcinoma and 4 % risk of basal cell carcinoma compared to non-O group.[16] It is also associated with a reduced risk of pancreatic cancer.[17,18] 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.[19] The 'B' antigen links with increased risk of ovarian cancer.[20] Coronary artery disease (CAD) is also very common here but risk of CAD is same in all blood groups.[21] persons having group A are affected more frequently with coronary heart disease, ischemic heart disease, venous thrombosis and

atherosclerosis, while its low in people with blood group 'O' which stated to have protective effect against these diseases.[22] 'Gastric cancer has reported to be more common in blood group 'A' and least in group 'O'.[23]

CONCLUSION

The present study concludes that 'B' group is the commonest blood groups among the medical students, frequency of ABO groups are same in both male and females. Regarding Rh blood group system, frequency of Rh (+) ve group is more in females compare to males. The present study provides information regarding safe transfusion; apart from transfusion service knowledge of the blood group system helps to take preventive measures against the diseases which are associated with different blood groups, to prevent the dangerous transfusion reactions and efficient management, as well as resolving certain medico-legal issues, particularly of disputed paternity cases. Groups of individual indicated on national identity cards, driving licenses and School/office identity cards will be of tremendous use in case of acute hemorrhage or anemia in children when urgent transfusion is required.

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