



A study to assess prevalence of blood groups in II semester medical students of G. R. Medical college Gwalior MP, India

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Abstract:

Background : The ABO Blood Group system was the first human Blood Group System to be discovered by Landsteiner in 1900. The second type of Blood Group System is the Rhesus system. There are only two Rh phenotypes such as Rh positive and Rh negative depending on whether Rh antigen is present on the red cell or not .The frequency of ABO and Rh phenotypes in different population has been extensively studied. Based on this the present study has been undertaken to assess the prevalence of Blood Group according to ABO blood group , Rh system and to correlate with their sex, category and religion and also to determine the predominated Blood Groups among them. **Materials & Methods:** The present study has been undertaken in the IInd semester students in the Hematology Lab of Department of Physiology. A total of 150 students were admitted through MP PMT 2012 , All India 2012, GOI seat and NRI seat of different categories but only 119 students participated in the study .15 were absent continuously due to their family problems 16 were absent in all the three turns when the practical was repeated . Hence they were excluded from the study group. **Results:** The Blood Group O had the highest prevalence in the II Semester students 37(31.09%) followed by blood group B 36 (30.25%). **Conclusion:** The commonest ABO blood group was O with Rh negativity of only 9(7.57%).

Key words: ABO Blood Group; Medical students; Prevalence of Blood Group; Rh positive Blood Group; Rh Negative Blood Group

Introduction

The first blood group antigen system was recognized in 1900, was ABO, the most important in transfusion medicine. The major blood group of this system are A,B, AB, and O. O type RBC lack A and B antigens . These antigens are carbohydrate

attached to a precursor backbone, may be found on the cellular membrane either as glycoproteins or glycopospholipids, and are secreted into plasma and body fluids as glycoprotein. H substance as the immediate precursor upon which the A and B

antigens are added. The H substance is formed by the addition of fucose to the glycolipid or glycoprotein backbone. The subsequent addition of N-acetylgalactosamine creates the A antigen, while the addition of galactose produces the B antigen [1, 2].

People have always been fascinated by blood, ancient Egyptians bathed in it, Aristocrats drank it, authors and play wrights used it as a theme and modern humanity transfuses it [3]. In order to avoid danger of mismatched blood transfusion, it is important to determine the blood group of those involved prior to a transfusion. These days, to eliminate the risk of transfusion reaction, the practice of autologous transfusion is followed by most of the physician [4].

The routine practice of blood typing and cross matching blood products should prevent adverse transfusion reactions caused by ABO antibodies. However, clerical error can result in transfusion reaction that can be fatal [5]. The knowledge of distribution of ABO Blood Group is most important as certain diseases, malignancies have predilection for certain Blood Groups [6]. Different Blood Groups have been shown to be particularly associated with different diseases as well [7,8].

Rh system emerged as 2nd most important Blood Group System due to Haemolytic Disease of Newborn and its importance in RhD negative individuals in subsequent transfusions once they develop Rh antibodies [9].

Based on this, the objective of this study was to find the frequency of different Blood Groups among the medical students so as to prepare the database for the blood bank for this institution and to create awareness for who is exposed to which of the diseases.

Materials and Methods

The present study has been undertaken in the 2nd semester students in the Hematology Lab of Department of Physiology. A total strength of 150 students were admitted through MP PMT 2012, All India 2012, Government of India seat and Nonresident Indian seat of different categories, but only 119 students participated in the study. 15 were absent continuously due to their family problems, 16 were absent in all the three turns when the practical was repeated. Hence they were excluded from the study group. The study period was from January to March 2013. Informed consent was taken prior to the procedure. The study was approved by the Ethical Committee of the College.

Procedure-Blood Grouping was carried out by using commercially prepared Antisera - Anti A & Anti B, and for ABO grouping and Anti Rh (Anti D). Presence of Rh (D) antigen for Rh Grouping. For the test a drop of capillary blood was taken to determine blood groups. Blood was collected by a finger prick with a sterile needle with all aseptic precautions. Cell suspension was prepared by adding one drop of blood into 8 – 10 drops of Normal Saline in a watch glass. For the test a drop of each of the Anti sera, Anti A, Anti B, and Anti D were placed on separate glass slides. One drop is taken from each student's cell suspension and mixed with each Antisera (Anti A, Anti B, and Anti D) using separate glass rods. The blood groups were determined on the basis of agglutinations immediately or after 8 to 10 minutes.

Results

A total 119 students participated in the study in which 79(66.39%) were males and 40(34.61%) were female students. The mean age of the students was 25+/- 8.77 in Males and 21+/-5.71 in Females. The maximum percentage of the age group for admission in this batch was 20 yrs (20.26%) in Males and 19yrs (27.50%) in Females students as shown in Table No 1.

The maximum prevalence regarding the frequency of different types of blood groups was O,37 (31.09%), B,36(30.25%), A,34 (28.57%), and AB (10.09%) respectively as shown in Figure 1. Among male students B & O Group 24 (30.38%) had the maximum prevalence followed by A, 21 (26.58%) & AB 10 (12.66%) respectively and among females students O and A Groups 13(32.50%) had the maximum prevalence followed by B,12(30%) and AB 2(5.00%) respectively as shown in Bar Figure No. 2.

Among 119 students 110 (92.43%) were Rh +ve while only 9 (7.57%) were Rh-ve as shown in Figure 3. The % of Rh -ve females was more in comparison to Rh-ve Males as shown in Figure No. 4a.

The maximum No. of students were hindus i.e. 109 (91.60%) followed by muslims, christians, sikhs respectively i.e. 5(4.20%), 4(3.36%), and 1(0.84%). The maximum number of students belonged to Unreserved Category followed by OBC SC and ST respectively i.e. 42 (35.29%), 34(28.57%), 23(19.33%) and 20(16.81%) respectively. Among males students the maximum No was of OBC Category i.e. 27(34.18%) and in Females the maximum No. was of unreserved category i.e. 20(50%) as shown in Table No. 2.

Table 1: Showing The Age and Sex- wise distribution of the Participants

Sl.No.	Age in yrs	No. of Male students	Percentage	No. of Female students	Percentage	Total	Percentage
1	17	0	0	4	10.00	4	3.36
2	18	10	12.66	9	22.50	19	15.97
3	19	10	12.66	11	27.50	21	17.65
4	20	16	20.26	10	25.00	26	21.84
5	21	14	17.73	04	10.00	18	15.13
6	22	7	8.86	01	2.50	8	6.72
7	23	11	13.92	01	2.50	12	10.08
8	24	4	5.06	00	0.0	4	3.36
9	25	4	5.06	00	0.0	4	3.36
10	26	3	3.79	00	0.0	3	2.52
	Total	79	100.00	40	100.00	119	100.00

Table 2: Showing the Co-relation of Category and Sex wise distribution of Blood Groups

Males

Category	A +ve No (%)	A-ve No (%)	B+ve No (%)	B-ve No (%)	AB+ve No (%)	AB-ve No (%)	O+ve No (%)	O-ve No (%)
UR N=22	07 (31.81%)	00 (0%)	05 (22.73)	0 (0%)	0 (0%)	0 (0%)	09 (21.43%)	01 (4.54)
OBC N=27	08 (29.62%)	0 (0%)	10 (37.04%)	0 (0%)	02 (7.40%)	0 (0%)	07 (25.93%)	0 (0%)
ST N=23	03 (25%)	0 (0%)	02 (16.67%)	0 (0%)	02 (16.67%)	0 (0%)	02 (16.67%)	03 (75.0%)
SC N=20	03 (16.66%)	0 (0%)	04 (38.88%)	0 (0%)	05 (27.78%)	01 (5.55%)	02 (11.11%)	0 (0.0%)

Females

Category	A +ve No (%)	A-ve No (%)	B+ve No (%)	B-ve No (%)	AB+ve No (%)	AB-ve No (%)	O+ve No (%)	O-ve No (%)
UR N=20	04 (20%)	00 (0%)	06 (30%)	01 (5%)	02 (10%)	0 (0%)	05 (25%)	02 (10%)
OBC N=7	03 (42.86%)	0 (0%)	01 (14.28%)	0 (0%)	0 (0%)	0 (0%)	02 (28.57%)	01 (14.28%)
ST N=11	04 (36.36%)	0 (0%)	04 (36.37%)	0 (0%)	0 (0%)	0 (0%)	03 (36.36%)	0 (0%)
SC N=02	02 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0.0%)

Table 3: Showing the Co-relation of Distribution of Types of Blood Groups in relation to Religion

Religion	A +ve No (%)	A-ve No (%)	B+ve No (%)	B-ve No (%)	AB+ve No (%)	AB-ve No (%)	O+ve No (%)	O-ve No (%)
Hindus N=109	31 (28.44%)	00 (0%)	31 (28.44%)	01 (0.91%)	10 (9.19%)	01 (0.91%)	28 (25.69%)	07 (6.42%)
Muslims N=5	01 (20%)	0 (0%)	04 (80%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Christians N=4	1 (25%)	0 (0%)	0 (0%)	0 (0%)	1 (25.0%)	0 (0%)	02 (50%)	0 (0%)
Sikh N=1	01 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0.0%)

Figure 1: Bar showing the frequency of different types of Blood Groups

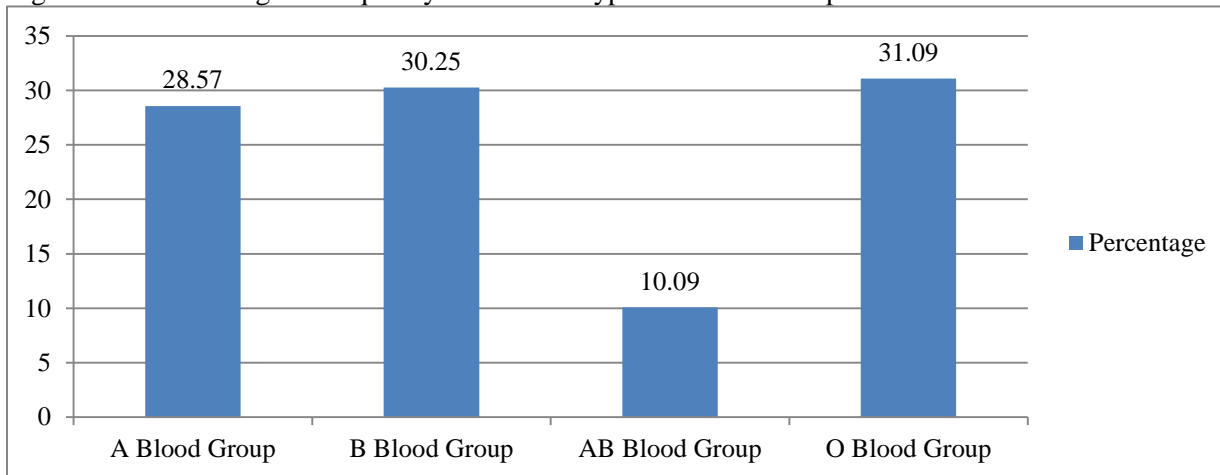


Figure 2: Bar showing the Sex-wise Distribution of Prevalence of different types of Blood Groups

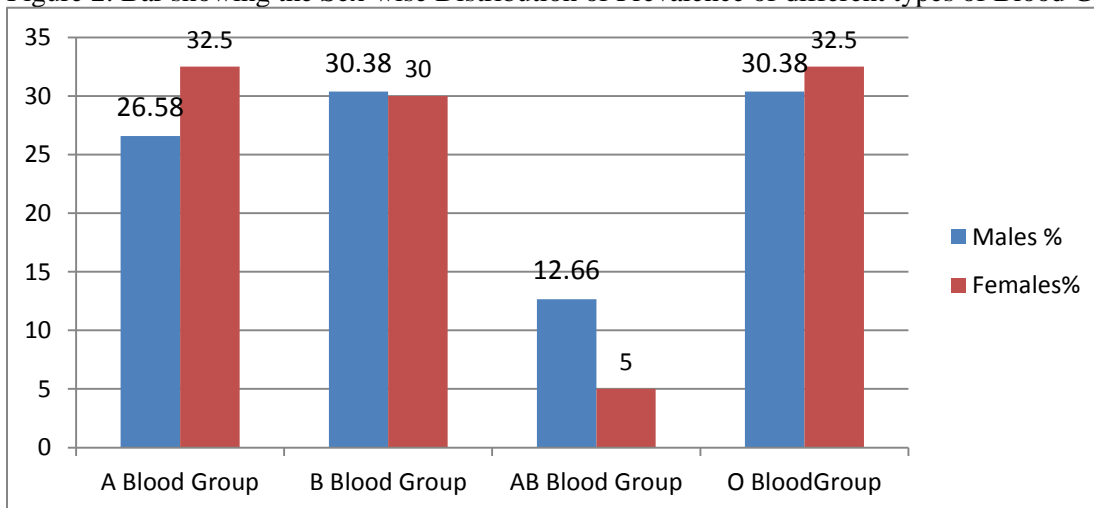


Figure 3: Pie Chart Showing the Prevalence of Rh Blood Group

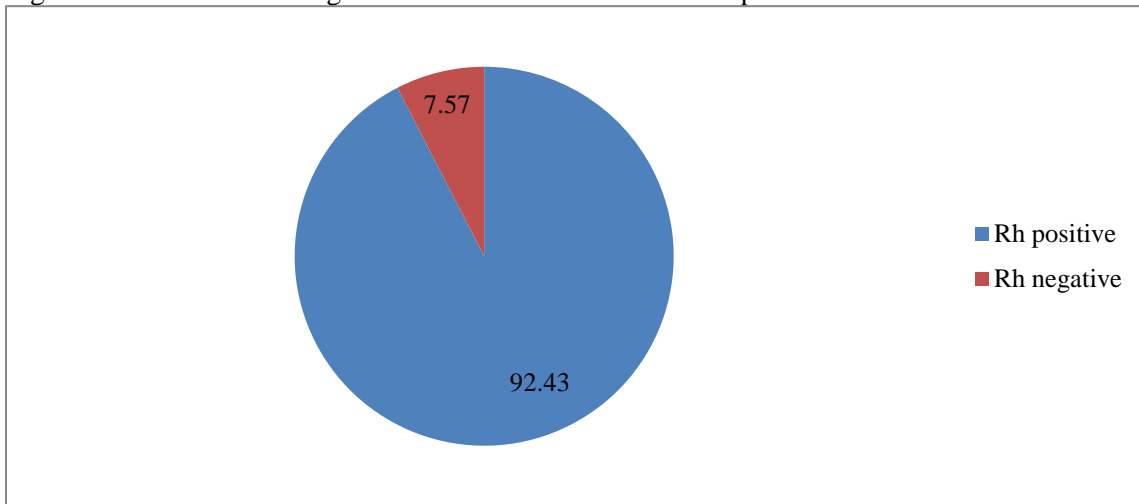


Figure 4a: Bar shows Sex-wise distribution of Rh+ve and Rh-ve Blood Group

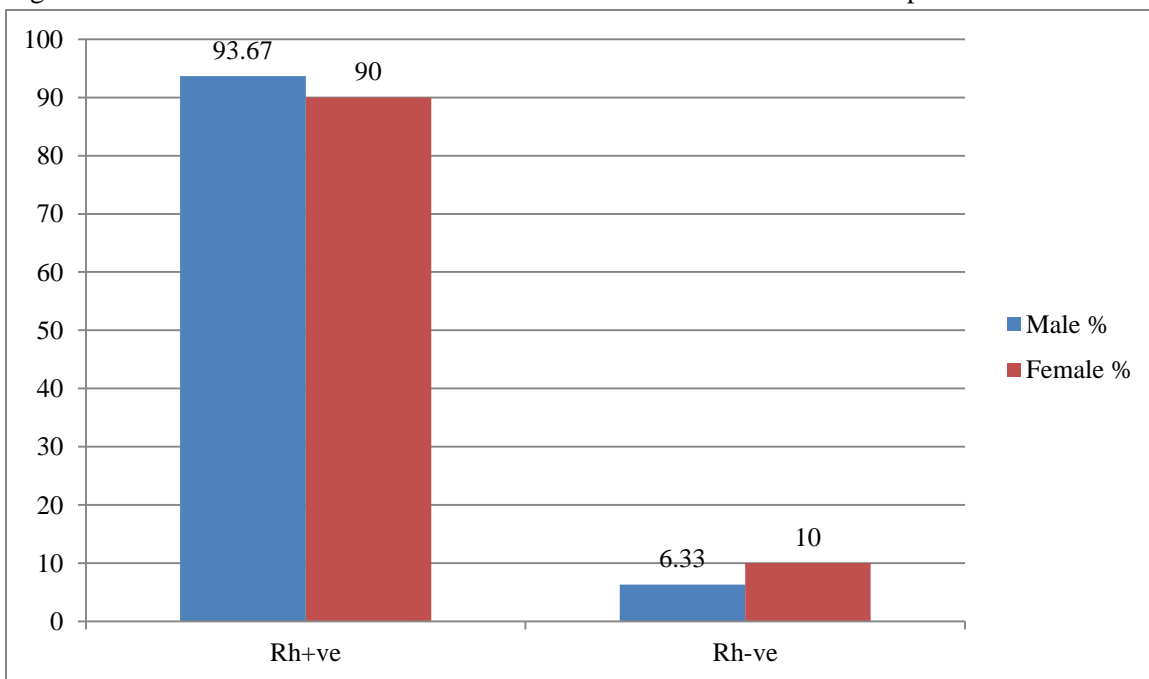
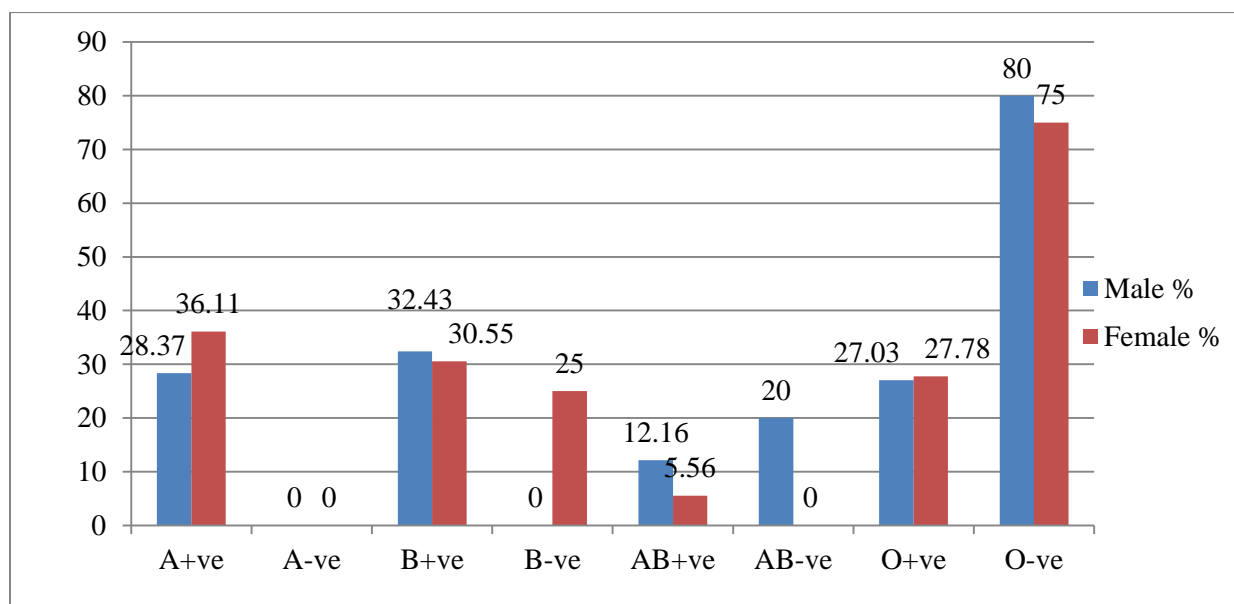


Figure 4b: Bar showing Sex-wise prevalence of different types of Blood Group



As shown in Figure 4b. Among Males and in Females the percentage of O-ve is highest i.e. 4 (80%) and 3(70%) respectively. It was seen that in unreserved category in males only O-ve was existing i.e. 1 (4.54%) while in Females there was both O-ve and B-ve i.e. 2(10%), 1(5%) respectively. In OBC Category the criteria was different i.e. no Rh-ve blood Group in Males but in Females O-ve was existing as shown in Table No 2. As shown in Table No.3 the maximum prevalence was of O+ve in Hindus i.e. 28(25.69%) and 2(50%) in Christians.

Discussion

Research on ABO Blood Group system has been of immense interest due to its medical importance in different diseases. The ABO Blood Group system is not only important in blood transfusion, cardiovascular diseases, organ transplantation, erythroblastosis in neonates but also one of the strongest predictors of national suicide rate and a genetic marker of obesity [10,11]. The genetic history of person can be known by studying the blood group [12].

Karl Landsteiner [13] first described the ABO Blood Group in 1900 and it served the beginning of blood banking and transfusion medicine. The membrane of a human Red Blood Cell contains a variety of blood group antigen, the most important and best known of these are A and B antigens. The Rh Blood Group system was the fourth system to be discovered by Levine & Stetson in 1939, yet it is the second most important in blood transfusion [14]. It has been observed that percentage of the blood group distribution in different part of the world is different depending upon the ethnic origin of the races [15].

In the present study it was seen that the predominated blood group was O followed by B, A and then AB. Similar results was seen in Shaik YA et al study [16]. Yousaf et al in his study from Bahawalpur showed the different prevalence of blood group in which highest prevalence was of B followed by O, A, and AB respectively[17].

In this study in Males the rate of Blood Group O and B was similar 24 (34.38%) but in Females the Blood Group O and A had similar results 13 (32.50%) followed by B and AB 12 (30%) and 2(5%) respectively.

In Rhesus system, in the present study it showed the prevalence of Rh+ve as 110(92.43%) while Rh-ve as 9(7.57%). These figures are similar to other studies done in Northern India [17] and other studies carried out in Maharashtra [18,19]. In contrast USA showed Rh positivity of 85%. Rh positive Group though the predominated group all over the country has a varied distribution in USA and UK as compared to other parts of the world [20].

In the study done by Tulika Chandra and Ashish Gupta in total of ABO Blood Group was Group B (34.84%) followed by Group O (29.75%), Group A (21.50%), Group AB (13.91%) while in this study it is O (31.09%), B(30.25%), A(28.57%) and AB (10.09%) respectively.

In the study done by Tariq Kamal Jafri, Kiran Mehtab et. al. [21], the dominated blood group was B (40%), Group O (32%), Group A (20%), Group AB (8%) in which the similar results are also seen in the present study.

Conclusion

Thus everyone should have knowledge of their blood group. This not only saves lives of patients when a transfusion is required but also predicts who is prone to which of the diseases as many diseases have association with certain blood groups although more research is required in this aspect.

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