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Frequency and Distribution of Blood Groups Among Medical Students in Davanagere

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Abstract :

Background : Till now numerous blood group systems have been identified but the ABO and Rhesus (Rh) blood groups remain clinically most important. Karl Landsteiner in 1901 discovered the first human blood group, the ABO group. Later, Rh blood group was defined by Landsteiner and Wiener .The need for the study of frequency distribution of blood group is multipurpose. Knowledge of the distribution of ABO and Rh blood group is essential for effective management of blood banks inventory, clinical studies, genetic research, forensic pathology, anthropology and tracing ancestral relation of human.

Aims: This study was done to know the frequency distribution of blood groups among medical students in Davangere.

Materials and Methods: This study was conducted on 152 medical students in the Department of Physiology at JJM medical college, Davanagere. The blood samples were collected by finger prick method. ABO blood grouping and Rhesus factors (Rh) typing determined by glass slide method.

Results: In our study, the most frequent blood group was O (41.5 %) followed by B group (32.2 %), A group (19%) and least being AB group (7.2%). Among Rh blood group, 94% students were Rh positive whereas only 6% were Rh negative.

Conclusion: The study further confirms that blood group O is the commonest of the ABO blood group system in the population studied and AB blood group is the least. Rhesus positive was commoner than Rhesus negative

KEY WORDS: ABO Blood groups, Blood groups, Distribution, Frequency, Medical students, Rhesus Typing.

Introduction

Since 1901, numerous blood group systems have been identified but the ABO and Rhesus (Rh) blood groups remain clinically most important. Karl Landsteiner in 1901 discovered the first human blood group, which was the ABO group[1]. Later, Rh blood group was defined by Landsteiner and Wiener in 1941[2]. Together these two systems have proved to be the most important for blood transfusion purposes. In modern medicine, the need for blood group frequency and prevalence studies is multipurpose, as besides their importance in evolution, their relation to disease and environment is being increasingly important[3]. Besides, being important in relation to blood transfusion and organ transplantation, blood group antigens can also be utilized in genetic research, forensic pathology, anthropology and training ancestral relation of human[4].

Knowledge of the distribution of ABO and Rh blood group 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].

Knowledge of blood group distribution is also important for clinical studies, for reliable geographical information and it will help a lot in reducing the maternal mortality rate, as access to safe and sufficient supply of blood will help significantly in reducing the preventable deaths. Therefore, it is important to have information on the frequency distribution of these blood groups in any population.

Material And Methods

This cross-sectional observational study was conducted on medical students in the Department of Physiology at JJM Medical College, Davangere, after taking their informed written consent and institutional ethical committee clearance.

Total of 152 medical students, 85 males and 67 females, volunteered to participate in the study. The blood samples were collected by finger prick method under aseptic precautions. The ABO blood grouping and Rhesus factors (Rh) typing determined by glass slide method, which is based on antigen antibody agglutination. Commercially available standard anti sera

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A, anti sera B and anti sera D were used for the study. RBCs suspended in isotonic saline were treated with anti-A, anti-B and anti-D anti sera on separate glass slides, marked as A, B and D and mixed with separate applicator sticks. The mixture observed for agglutination, both macroscopically and micro scopically and compared with the control.

The blood group was determined based on agglutination with the corresponding anti sera. If agglutination was present in the blood drop A , then it belongs to A blood group, agglutination in blood drop B, B group, agglutination in both A and B blood drops, AB group and if no agglutination in both A and B drops, then O group. Similarly, agglutination in blood drop D was considered as Rh Positive and no agglutination Rh negative. The data was expressed as percentages.

Results

Out of total 152 medical students who volunteered, 85(55.9%) were males and 67(44.1%) females. The results illustrated in Table 1 and 2, Fig 1,2 and 3. In our study, the most frequently occurring blood group was O (41.5 %) followed by B group (32.2 %), A group(19%) and AB group(7.2%) (Fig 1). 143(94%) students were Rh positive whereas only 9 (6%) were Rh negative (Fig 2).

In Rh-positive blood group distribution, O blood group had highest frequency of 39.9%(57) followed by B (32.9%, N=47), A (19.5%, N=28) and AB (7.7%, N=11). Rh-negative blood group distribution showed 66.7 %(N=6) belonging to O group followed by B (22.2%, N=2) and A (11.1%, N=1).there were no Rh negatives in AB group (both males and females), also in A and B blood groups among males. Among Rh positive males, both O and B blood groups shows equal distribution whereas in females (both Rh positive and negative) O blood group shows the highest frequency followed by B,A and AB (Fig 3).

Discussion :

The study of frequency distribution of blood groups is important as it plays a vital role in blood transfusion, organ transplantation, genetics research, human evolution, forensic pathology and also, some blood groups have shown associations with diseases like duodenal ulcer, diabetes mellitus and urinary tract infection [6]

It has been observed, that percentage of blood group distribution is different in different parts of the world depending upon the ethnic origin of the races. 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% AB [7].

Asiatic trend of prevalence of blood groups (O>B>A>AB) has been reported by studies conducted in the South [8-11] which is similar to our study.

In our study, the frequency distribution of blood group O was the highest with percentage frequency of 41.5% followed by blood group B, 32.2%; blood group A, 19% and the least percentage frequency being AB with 7.2%.Our study further confirmed that Rhesus-positive(94%) has the highest percentage frequency while Rhesus-negative (6%) has the lowest percentage frequency. In Rh-positive blood group distribution, O blood group has the highest frequency of 39.9 % followed by B 32.9%, A 19.5% and AB 7.7%. In Rh negative blood group distribution, 66.7 % belong to O group followed by B 22.2% and A 11.1%. Rhesus negative was found to be higher in females than in males but the Rhesus-positive was higher in males than in females.

There is also difference in the distribution of blood groups in population within India.

The studies done in Northern parts of India by Chandra et al at Lucknow[12] , Sindhu et al [13] Punjab and Behra et al at Jodhpur[14] showed blood group B was the commonest, followed by O, A and AB, which is different from our study. In Western parts of India like in Ahmedabad region of India, most predominant blood group is B (36.5%), followed by O (30.5%), A (21%) and AB (12%) [15].

Studies done at Surat by Nidhi Mehta et al[16] and Giri [17] et al at Maharashtra, showed blood group B as the commonest followed by O, A and AB. Study done in Eastern part of India, Durgapur by Nag et al[10] and in Southern part of India by Periyavan et al at [9] Bangalore , Das PK Nair et al[18] at Vellore, at Davangere by Mallikarjuna S. et al[19] and at Shimoga – Malnad study done by Girish et al[20] found that commonest blood group was O followed by B, A and AB, similar to our study.

The frequency of blood group showed O as 42.0% (40.1% O Rh positive and 1.8% O Rh negative) B as 27.3% (25.6% B Rh positive and 1.62% B Rh negative) followed by A 25.8% (24.3% A Rh positive and 1.4% A Rh negative) and blood group AB as 4.8% (4.4% AB Rh positive and 1.4% AB Rh negative) Rh positive were 94.64% and Rh negative were 5.35% [6].

Available literature indicates that over 99% Asian are Rh positive [21] but among our subjects 94% were Rh +ve and 6% Rh –ve. It is close to the findings of Parmanik and Parmanik from Nepalese students, in Nepal medical college, Kathmandu. Their subjects were 96.66% Rh+ve and 3.33% Rh –ve [22]. Rh blood group is documented as 5% in Nairobi [23], 4.5% in Nigeria [24].

Conclusion

The study confirms that blood group O was the commonest of the ABO blood group system among the medical students studied and AB blood group was the least. Rhesus positive was commoner than Rhesus negative. Knowledge of blood group distribution is important for clinical studies, for reliable geographical information, blood bank management and for forensic studies in the population.

Table 1: Frequency distribution of different blood groups amongmedical students

Blood groups	Males (N=85)	Females (N=67)	Total (N=152)
A	17	12	29(19%)
B	30	19	49(32.2%)
AB	05	06	11(7.2%)
O	33	30	63(41.5%)
Rh Positive	82	61	143(94%)
Rh Negative	03	06	09(6%)

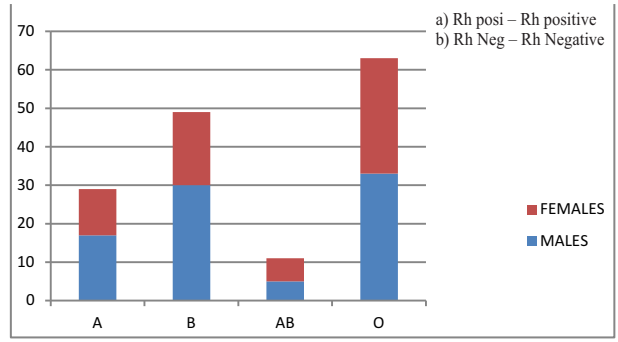

Fig 1: Bar chart showing frequency distribution of ABO blood groups among medical students

Table 2: Gender wise distribution of ABO and Rh blood group system

ABO	MALES (n)			FEMALES (n)			TOTAL (n)		
	Rh posi	Rh Neg	Total	Rh posi	Rh Neg	Total	Rh posi	Rh Neg	Total
O	30	03	33	27	03	30	57	06	63
A	17	00	17	11	01	12	28	01	29
B	30	00	30	17	02	19	47	02	49
AB	05	00	05	06	00	06	11	00	11
Total	**82**	**03**	**85**	**61**	**06**	**67**	**143**	**09**	**152**

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