

Observational Cross Sectional Study on Blood Donors

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Abstract

Objective: This study was conducted to document the frequency ABO & rhesus blood groups in potential male blood donor belong to south area of Karnataka. **Design:** Observational cross sectional study. **Settings:** Blood transfusion center at Davanagere, Karnataka. **Subjects & Methods:** The data of blood donors from July 2009 to December 2009. **Results:** Total number of donors studied was 3048. The commonest blood group was O present in 37.87% followed by B in 29.98%, A in 23.88% and AB in 8.29%. While 95.41% donors were Rh positive and 4.59% was Rh negative. The maximum donors were between in age group 20-39 years. The maximum prevalence of Hemoglobin % ranges from 13.0-13.9 about 2983(75.11%). The maximum prevalence of weight among the donors was between 60 to 69Kgs about 1201(39.40%) and the least weight appears between 80 to 90Kgs about 254(8.4%). **Conclusion:** Blood group O is the commonest ABO blood group and 95.41% are Rh + in this area, the maximum prevalence of donors in age group, Hb% and Weight are 20.39 yrs, 13.0-13.5 gm% and 50-69 Kgs respectively.

Key Words: ABO blood group, Rhesus blood group, Prevalence of age group, weight and Hb% in blood donors.

INTRODUCTION

The proper selection volunteer donors is one of the pre requisites of any blood transfusion service, Whilst the primary function of the service is the collection and supply of blood, it is essential to first ensure that the volunteer is fit to donate blood without any detriment to the health. The presence of major disorders like tuberculosis, diabetes, epilepsy,

goiter, hypertension, cardiovascular or cerebrovascular disease would also exclude the volunteer from being a donor. It will be noted that a large no of volunteers were rejected for being under weight and low hemoglobin percentage. This was especially in the case of female volunteers who often were rejected for these reasons [1].

A minimum weight is necessary to ensure that the smaller built donors are not ever bled. The minimum weight adopted by the service below which volunteers are not accepted is 100 lbs & 95 lbs in the females. The large proportion of the local population with blood weight of 8 stones (112lbs) or less has made it necessary to adopt a lower minimum weight.

It is generally accepted that potential blood donors should be rejected if their Hemoglobin level is below 12.5 gm%, this level applies to both sex & is the standard adopted by the Singapore blood transfusion service [2]. However there is now a trend to raise this level to 13.5gm % in the case of male donors taking into considerations the fact that males have been found to have higher hemoglobin levels. The donors who showed hemoglobin below 12.5 gm% were not accepted. The majority of donors were between 13 to 15gm percent [3].

Blood groups being the simple and most appropriate genetic markers still continue to rule in studies of human population variation and also it is available tool in blood transfusion, forensic medicine and paternity disputes (Bhasin et al. 1994; Basin and Walter 2001) [4].

The discovery of almost universally present and naturally occurring antibodies in blood plasma led to the discovery of the ABO blood group system which remains, more than 100 years later, the most important and clinically significant of all the blood group this system derives its importance from the fact that A and B are strongly antigenic and anti A anti B occurs naturally in the serum of persons lacking the corresponding antigen. These antibodies are capable of producing hemolysis in VIVO. Rhesus blood group system was the fourth system to be discovered and yet it is the second most important from the point of view of transfusions [5].

Material & Methods

The Study group included a total of 3048 voluntaries male blood donors. Collected from July 2009 to December 2009. It is an observational cross sectional study. The data was collected from the records of blood transfusion center, Davanagere.

ABO blood grouping was carried out by two methods using commercially prepared antisera; anti A, Anti B & anti AB for the direct grouping and reagent cells. Presence of Rh (D) antigen was determined by Anti D.

A detailed standardized donor questionnaire, determination of body weight, Hemoglobin % & physical examinations were administered to all potential donors.

Results

Total numbers of blood donors were 3048. All are male blood donors of age group ranging from 20 to 50 years.

Table 1. Distribution of study population according to Prevalence of age groups in blood donors

Age Group	Subject	% Percentage
20-29	1966	64.50
30-39	843	27.65
40-49	217	07.13
>50	22	00.72
Total	3048	100.00

Maximum prevalence of age group among blood donor was between 20 to 29 years about 1966 (64.50%) and the least of age group between 40 to 50 years about 339(7.85%) as shown in Table 1.

Table 2. Distribution of study population according to Hb% in blood donors

Hb%	Subject	% Percentage
12.5-12.9	450	14.76
13.0-13.4	1206	39.57
13.5-13.9	1077	35.34
>14	315	10.33
Total	3048	100.00

The maximum prevalence of hemoglobin percentage among the blood donors were in the range 13.0 to 13.4 about 1206(39.57%). And the least of Hemoglobin percentage can occur above 14.0 was about 315 (10.33%) Table 2.

Table 3. Distribution of study population according to Weight in blood donors

Wt	Subject	% Percentage
50-59	1015	33.30
60-69	1201	39.40
70-79	573	18.80
80-89	204	06.70
>90	50	01.70
Total	3048	100.00

The maximum prevalence of weight among the donors was between 60 to 69Kgs about 1201(39.40%) and the least weight appears between 80 to 90Kgs about 254(8.4%).

Table 4. Distribution of study population according to blood groups

Blood Groups	Subject	% Percentage
A	728	23.88
B	914	29.98
AB	252	08.27
O	1154	37.87
Total	3048	100.00

Blood Group-O was the most prevalent group i.e., 37.87% while AB was the least prevalent group i.e. 8.27%. Majority 95.41% were Rh positive and 04.59% were Rh negative, as shown in table 4& 5.

Table 5. Distribution of study population according to Rh Factors among blood donors

Rh factor	Subject	% Percentage
Positive	2900	95.41
Negative	148	04.59
Total	3048	100.00

Discussion

Licensing of blood bank in India is covered under the drugs and cosmetics rules 1992 of the ministry of health and family welfare, Government of India. Blood banks are supposed to take blood from voluntary donors achieving since 1998 [6].

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 transfusions [7]. Another important aspect of such studies is that some diseases have been found to be more common in some specific blood groups. Apart from these the knowledge of distribution of ABO blood groups is

most important as certain diseases/malignancies have prediction for certain blood groups [8].

The distribution of ABO blood groups in both Rh (D) positive and negative subjects. Present study shows that, the frequency of blood group-O was the highest with percentage frequency of 37.87, followed by blood group-B with the % frequency of 29.98, blood group A with the % of 23.88 & and the least % frequency is that of blood group AB which is 08.27 .

A similar distribution of ABO blood group to our study was found in Saudi Arabia, Egypt, Sudan, Iraq, Libya & Kuwait [9]. However other countries such as Syrian Arabs, Lebanon, and Israel & Jordan have a different ABO spectrum in which blood group A is the predominant [10].

Rh distribution varies within any group of human population in this study it was observed that Rh positive is the highest with percentage frequency 95.41 and that of Rh negative was found to be 04.59%.

The Rh blood group system has been distributed among any population to keep the frequency of Rh negative very low since clinical situation could arise through Rh blood incompatibility [11].

Present study, maximum male donors of 2809 were between age group 20-39 years, because young adult persons are usually willing to donate blood then other age group. It was also evident that blood donors were Male and there are no female donors, because of lack of education, awareness and fear regarding blood donation [12].

The prevalence of Hemoglobin % among the blood donors is more important for the donation of blood to the recipient [13]. The maximum prevalence of Hemoglobin % ranges from 13.0-13.9 about 2983 (75.11%) in our study.

It is generally accepted that potential blood donors

should have more than 13 gm% of Hb. If their Haemoglobin level is below 12.5 gm% that potential donor should be rejected [14]. This level applies to both sex and is the standard adopted by Singapore blood transfusion service. However there is now a trend to raise the level to 13.5 gm% in the case of male donors taking into consideration the fact that males have been found to have higher haemoglobin levels [15].

The prevalence of weight among the male blood donors was between 50-69 Kg about 2216 (69.70%) of 3048 blood donors. So it will be noted that a large no of volunteers were rejected for being under weight, this was especially so in the case of female volunteers. A minimum weight is necessary to ensure that the smaller built donors are not over bled. Minimum weight adopted by the service below which volunteers are not accepted is 38 Kg. This is lower than the minimum weight of 41 Kg adopted by other transfusion service.

The large proportion of the local population with body weight of 42 Kg or less has made it necessary to adopt a lower minimum weight. Couple with this the volume of blood withdrawn from such donor is proportionately reduced, by so doing service has been able to accept many more volunteer than would have been possible if the higher weight requirements were followed. The blood do noted is equally useful & is mainly used for Pediatric cases, where the transfusion needs are small usually less than ½ ltr [16].

Similar patterns of distribution is also observed in other studies like Rh (D) negative blood group is documented as 5.5% in South India, 5% in Nairobi, 4.5% in Nigeria, 7.3% Lahore[17].

Conclusion

The study has significant implication regarding the management of blood bank and transfusion service

in this area. Knowledge of blood group distribution, prevalence of age, haemoglobin percentage and weight are important for clinical studies.

The present study recommended that the average age is 20 to 29 with haemoglobin percentage to be more than 12.5 of weight in the range 50 to 70 Kgs.

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

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