

Demographic Status and Blood Group of Family Blood Donors with a Focus on Their Rejection

Dipta TF^a, Akhter Z^b, Datta A^c, Nahar Q^d, Islam MA^e

Abstract

Background: The aim of donor selection should protect donors from any potential harm which may occur as a direct result of the donation process; secondly, shall protect recipients of blood transfusions from adverse effects, such as transmission of infectious diseases or other medical conditions and unwanted effects caused by any medications taken by the donor. Any reason for deferral, whether temporary or permanent, have been explained to the donor and recorded as per National Guideline and Blood Safety Law. Literature search showed there is dearth information on replacement blood donors in Bangladesh. So this study has been done to evaluate replacement family blood donors, exploring their demographic status, occupation, blood groups and why they were rejected during donor selection.

Methods: This study was done to assess the demographic profile and blood group among family blood donors during donor selection. Age, weight, occupation, blood group and blood pressure have been explored among randomly selected two hundred ninety one blood donors attending Transfusion Medicine Department of BIRDEM as per Guideline.

Results: Among them 261 (89.69%) were male and 30 (10.31%) were female with $M \pm SD$ age 29 ± 6 and 29 ± 7 (yrs), respectively. Blood group of replacement family donors were, 'A' positive (39.7%), 'B' positive 90(32%), 'O' positive 18 (6%), 'AB' positive 39 (13%) majority (57.04%) were unmarried, 52.58% were doing business, while students were 29.90% and job holders were only 17.53%. Among nine deferred donors females were mainly rejected (89.28%) and the contributing factor was low blood pressure according to guideline. Finally 96.91% successful family blood donors donated blood for the patient party.

Conclusion: Our study showed proper selection and following of blood donation guideline help to determine the eligibility to donate blood. Moreover, this pilot study may contribute in evaluation of Bangladeshi family blood donors those had positive blood group and negative serological markers as per WHO (World Health Organization) guideline for Bangladesh.

Key Words: Replacement family blood donor; blood donor deferral

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Introduction

Blood transfusion is defined as the administration of blood or blood products into a blood vessel. One of the keys to a good blood transfusion is starting with good

blood. There is a massive effort to make sure that "the blood supply is safer than it has ever been."¹⁻³ The aim of the donor selection shall protect donors from any potential harm which may occur as a direct result of the

Author Informations

- Dr. Tashmim Farhana Dipta: Associate Professor, Transfusion Medicine and Haematology; Head of the Department of Transfusion medicine, BIRDEM General Hospital and Ibrahim Medical College, Dhaka, Bangladesh.
- Dr. Zakia Akter, Medical officer, Transfusion Medicine Department, BIRDEM General Hospital, Dhaka, Bangladesh.
- Dr. Anamika Datta, Senior Medical officer, Transfusion Medicine Department, BIRDEM General Hospital, Dhaka, Bangladesh.
- Dr. Quamrun Nahar, Senior Research Officer, Department of Biochemistry and Cell Biology, BIRDEM General Hospital, Dhaka, Bangladesh.
- Prof. Md. Ashadul Islam, Professor and Chairman, Department of Transfusion Medicine; Additional Registrar, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

Address of Correspondence: Dr. Tashmim Farhana Dipta, Associate Professor Haematology and Transfusion Medicine, Head, Department of Transfusion Medicine, BIRDEM General Hospital and Ibrahim Medical College, 122 Kazi Nazrul Islam Avenue, Shahbag, Dhaka-1000, Bangladesh. E.mail: tashmim@yahoo.com

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donation process; secondly, shall protect recipients of blood transfusions from adverse effects, such as transmission of infectious diseases or other medical conditions and unwanted effects caused by any medications taken by the donor. Guidelines should be followed in order to determine that the blood donation will not be detrimental to the donors or recipients as per blood safety law.¹⁻³ Individuals disqualified or rejected from donating blood are known as “deferred” donors. A prospective donor may be deferred at any point during the collection and testing process according to the World Health Organization (WHO) protocol and national rule of transfusion services.¹⁻³ Now-a-days, blood banking are accentuated with current trends of advanced skill in serological technique, provision of risk free blood components with therapeutic, logical and judicial use of blood, provision of out-patient treatment and day care facilities.¹⁻³ “Volunteer blood donors” are the blood donors who donates blood voluntarily, non-remunerated and as a repeated donor. The incidence of blood transmitted disease is much less in blood drawn from volunteers. In the United States, most whole blood donations come from volunteer donors but in our country it is near to 30%. On the other hand, blood donors who donate their blood as a replacement for their own blood or that of a friend or relative are called “replacement family blood donors”. According to the safe blood transfusion programme (SBTP), Bangladesh, 1.5% units of blood were rejected due to Transfusion Transmissible Diseases (TTI) where, replacement blood donors are about 70% and their selection usually done by the recipient party.^{2,3} Literature search revealed that there is dearth of information in Bangladesh, on sero-negative replacement blood donors having positive blood groups. So this study was a small tribute to evaluate replacement family blood donors, exploring their demographic status, occupation, types of ABO blood groups and focusing the cause of their rejection during donor selection.

Methods

This study was conducted at the Department of Transfusion Medicine, BIRDEM (Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders) at the end of June to the end of July 2014, among randomly selected, non-diabetic, replacement blood donors having positive blood groups. From their very first arrival confirmation of blood grouping done. If matched, after drawing their blood in blood bag, cross matching between the patient and replacement blood donors and screening of donor’s blood for five WHO recommended serological tests (HIV, Syphilis, HCV, HBV and Malaria) which are

mandatory for Bangladesh, were done as per WHO and national protocol¹. This process is known as; “Post donation screening and cross-matching or compatibility testing”.¹⁻³ Finally, blood components were prepared and stored for specific use by the designated recipient. This present study included only randomly selected sero-negative subjects having positive blood groups and WHO / SBTP (Safe Blood Transfusion Program) protocol¹⁻³ had been followed. A questionnaire was developed where relevant information on demographic and socio-economic data such as: age, weight, blood pressure, blood group, occupation and marital status were collected. History forms of blood donors¹ were consciously filled up by the donor, in front of a trained medical officer. If any person between the age of 18-50 years, having the systolic blood pressure between 100 -160 mm of Hg and the diastolic pressure between 60-100 mm of Hg without having any antihypertensive medication and fulfills the selected criteria as per protocol and SOP, can donate 450 ml blood with every 4 months interval, according to the national guideline of donor selection and WHO protocol.¹⁻⁴ Any reason for deferral, whether temporary or permanent, have been explained to the donor and recorded.

Statistical analysis

Statistical analysis was performed using SPSS (Statistical Package for Social Science) software for Windows version 10 (SPSS Inc., Chicago, Illinois, USA). All the data were expressed as Mean \pm SD (standard deviation), median (range) and/or percentage (%) as appropriate. The statistical significance of differences between the values was assessed by ANOVA or Mann-Whitney U test (as appropriate). Correlation was also seen among the parameters. A two-tailed *p* value of <0.05 was considered statistically significant.

Results

Random selection of two hundred ninety one replacement blood donors, attending Transfusion Medicine Department of BIRDEM, had been incorporated in this study. Table-I showed, the mean \pm SD of age to marital status of married and unmarried were 34 ± 5 and 25 ± 3 (yrs) accordingly, however, the mean age 28 ± 6 (yrs), between rejected and non-rejected groups showed no difference. Mean \pm SD Systolic blood pressure (mmHg) 116 ± 10 and 87 ± 3 between non-rejected and rejected groups and the M \pm SD diastolic blood pressure (mmHg) between those groups (78 ± 8 , 55 ± 8) showed difference. Thus both data showed that systolic and diastolic blood pressures were lower among

rejected or deferred donors as per SOP (Standard Operating Procedure) and protocol for blood donation¹⁻³, in comparison to their successful counterparts (Table -II). Table-III showed ABO blood types of total replacement donors, having positive blood groups, including 261 (89.69%) male and 30 (10.31%) female were as follows: 'A' positive (39.7%), 'B' positive 90(32%), 'O' positive 18 (6%), 'AB' positive

39 (13%) . Moreover, most of the male and female had "A" positive blood group. Beside this, majority of blood donors were doing business (52.58%), whereas, students were only 29.90% and the job holders were lowest (17.53%). However, rejection rate was minimal in this study, having nine deferred donors, including one male donor (10.72%), thus emphasizing female predominance (89.28%) in deferral participants.

Table I. Age & gender distribution and marital status among total replacement blood donors, N=291.

Variables of total replacement blood donors according to age and marital status:	Number (percentage)	t/p value and comments
Married	125 (42.96%)	Total number (Percentage) 291(100%)
Unmarried	166 (57.04%)	
According to marital status (age in years) :	Mean, median (range)	- 14.45/0.00 <i>Age were different between two groups</i>
Married	34±5, 34 (20-50)	- 0.53/0.29 <i>Age were not different between any of the two groups</i>
Unmarried	25±3, 25 (18-39)	
According to age: Total participants	Mean, median (range)	
Successful replacement blood donors	28±6, 27 (18-50)	- 0.15/0.88 <i>- No significant difference</i>
Rejected blood donors	28±6, 27 (21-36)	
According to gender (age in years):		
Male –	29±6, 27 (18-20)	
Female-	29±7, 26 (20-48)	

Table II. Blood pressure (Systolic and Diastolic) among total participants

Variables for total successful replacement blood donors and rejected blood donors	Results	t/p value or Comments
According to systolic blood pressure:	Mean, median (range)	- 4.31/ 0.00 <i>Systolic blood pressure was different between the two groups</i>
Successful replacement blood donors	116±10, 120 (85-140)	
Rejected blood donors	87±3, 27 (85-90)	
According to diastolic blood pressure:		- 3.10/ 0.00 <i>Diastolic blood pressure was different between the two groups</i>
Successful replacement blood donors	78±8, 80 (40-90)	
Rejected blood donors	55±8, 55 (50-60)	

N.B. - Results were expressed as Mean and Median (Range) as appropriate $p < 0.05$ were considered as a level of significance. Unpaired t- test was performed as a test of significance.

Table III. Total replacement blood donors according to professions and ABO blood groups

Variables of total replacement blood donors according to blood group	Number (percentage)		Comments
Participants:	Male (percentage)	Female (percentage)	Total number (Percentage)
Selected	261(89.69%)	30 (10.31%)	291(100%)
Rejected	260 (92.20%)	22 (7.80%)	282 (96.91 %) selected and 9 (3.09 %) deferred
<i>Professions:</i>	Number (percentage)		
Job	1 (10.76%)	8(88.30%)	
Business	51 (17. 53%)		
Student	153 (52.58%)		
<i>Blood group distribution:</i>	Male	Female	
'A' positive :	87 (29.90%)		
'B' positive :	40 (13.75%)	12 (4.12%)	
'O' positive :	94 (32.30%)	10 (3.44%)	
'AB' positive:	18 (6.18%)	03 (1.03%)	
	40 (13.75%)	05 (1.72%)	

N.B. - Results were expressed as Mean and Median (Range) as appropriate $p < 0.05$ were considered as a level of significance. Mann-Whitney test was performed as a test of significance in appropriate cases.

Discussion

A well-organized national blood transfusion policy and programme are the prerequisites to ensure effective and efficient implementation of safe blood transfusion. The safety of blood and blood product is a major concern all over the world.¹⁻⁵ Growing problems of transfusion-associated infections has been appreciated globally. Some of the major infectious diseases, including HIV/AIDS, hepatitis C, hepatitis B, syphilis and malaria are transmissible through blood.^{2,3} Using proper recruiting techniques, potential donors are properly pre-screened by use of an appropriate questionnaire that minimizes the risk of blood transmitted infections in the window period of the various viruses.^{2,3} During blood donation campaigns, it is crucial to ensure the safety of both the donor and recipient. The donor should willingly consent to donate blood without being pressurized. Appropriate donor selection is an important step in ensuring safe supply of blood and blood products.¹⁻⁵ This study showed, average age among the male and female blood donors were not different and mean age found 29 ± 6 and 29 ± 7 , according to the male and female respectively, which matched with other study, where mean age was about 29 ± 6 .⁷⁻⁹ But among non-rejected

and rejected replacement blood donors both systolic and diastolic blood pressures were lower in deferral donors in comparison to its successful participants. Thus our study differed with Arslan (2007), a study conducted among Turkish donors, where, main reason for their deferral was common cold or elevated temperature (20.4%) among male and low haemoglobin (51.6%) in female.¹⁰ Various study showed rejection of male donors varied from high-risk sex practice in the younger group and also hypertension or low hemoglobin among the older blood donors.¹⁰⁻¹⁵ Present study found that, female blood donors had higher deferral rate (89.28%) than male counter parts (10.72%); thus correlated with a study done in the Hospital Universiti Sains Malaysia (HUSM), where females contributing the majority of deferral due to low haemoglobin (40.7%); beside this, Arslan (2007) and a study done in Iran showing deferral rates for females and males 54.6% and 24.3% respectively, were similar with this study.^{10,12} But present study showed reverse relationship with an Indian study, where among 114 deferred donors males were predominated (89.47%) and females were only 10.52%.¹³ Various study showed dissimilarity, where with high blood pressure (29.4%) male donors were

predominating, however, medical illness, high risk behavior, failed venesection, low weight and self deferral donor also play role in those studies.⁵⁻¹⁰ On the other hand, present study did not show any significant difference in age, weight, gender distribution, blood group and occupation except mean age (yrs) among married 34±5 and unmarried 25±3 participants. In this study, 'A' positive people was 100 (37%), 'B' positive 90 (32%), 'O' positive 18 (6%) and 'AB' positive 39 (13%) among total replacement blood donors with a prevalence sequence of <A<B<AB<O. On the other hand, in Nepal, replacement blood donors showed, <O (33.33%) < B (32.11%), A (26.29%) < AB (8.27%) having dissimilarity with present study.¹⁶ Furthermore, a previous study done on blood group of Bangladeshi at BIRDEM, Dhaka showed dissimilarity with this study, where, frequency of blood group among male showed, <B (58.17%) < AB (54.13%) < A (54.02%) < O (48.39%) and female < O (51.61%) < A (45.98%) < AB (45.87%) < B (41.83%), with total prevalence of <B (34.36%) < O (30.40%) < A (26.68%) < AB (8.56%) among 1,28,506 population.¹⁷ When data were reanalyzed, only 3.09% were deferral donors compared to 96.91% normal successful blood donors. Thus our study correlated with Rabeya *et al* (2008) showing donor deferral rate was 5.6% among 4,138 donors and with an Indian study where, the percentage of deferred donors was 7.3% where majority of them (92.98%) being deferred for temporary reasons as per protocol.^{7,11,18} However, our study showed different result with Arslan (2007) where donor deferral rate was 14.6% among Turkish donors, Lawson- Ayayiet *al* (1999) where 10.8% of donor deferral found in a European study, Lim *et al* (1993) reported a 14.4% deferral rate, Custer *et al* (2004) showed a deferral rate of 13.6%, Zouet *al* (2008) in a study of American Red Cross blood services spanning over 6 years found that of 12.8%, in an Indian study done in New Delhi reported, approximately 9% of the blood donors were deferred and in a study done in Nigeria showed 17.7% voluntary non-remunerated blood donors were deferred, thus all those studies showed higher deferral rate than this study.^{5, 10-15} This present study showed, diastolic and systolic blood pressures were lower among deferral donors according to guideline^{1-3, 18} compared to normal successful counterparts, thus present study differed with other studies on donor deferral.⁸⁻¹⁵ Finally, minimum

(10.72%) female participation with majority female donor rejection emphasized that, further evaluation, motivation and clinical assessment on female blood donors are recommended.

Conclusion

This pilot study was a little effort to assess the status of replacement blood donors and why they were deferred. Hope this will help in blood donor selection and their clinical assessment practice in Bangladesh.

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Conflict of interest: None

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