Asian Hematology Research Journal

3(4): 17-22, 2020; Article no.AHRJ.60877

Transfusion Medicine: From Donors to Recipients; A Gender Perspective

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Authors' contributions

This work was carried out in collaboration among all authors. Author HK designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AM, MT, SZ and AK managed the analyses of the study and approved the manuscript final version.

Article Information

Editor(s):
(1) Dr. Dharmesh Chandra Sharma, G. R. Medical College & J. A. Hospital, India.
Reviewers:
(1) Virendra Kumar Singh, Navsari Agricultural University, India.
(2) Chinmaya Keshari Sahoo, College of Pharmaceutical Sciences, Puri, Biju Patnaik University of Technology, India.
Complete Peer review History: http://www.sdiarticle4.com/review-history/60877

Original Research Article

Received 12 July 2020
Accepted 18 September 2020
Published 02 October 2020

ABSTRACT

Objectives: To screen the donors for the frequency of ABO & Rh blood groups and gender contribution in blood donation.
Subject and Methods: This retrospective observational study was carried out in the Blood bank of Qazi Hussain Ahmed Medical Complex, Nowshera from 25th April 2019 to 5th Nov 2019. A total of 279 donors were included in the study. Record was taken from available data in Blood bank of Qazi Hussain Ahmed Medical Complex Nowshera. Donors & Recipients data were also recorded from the blood issuing form. ABO and Rh blood grouping were done by agglutination method using antisera A, antisera B and antisera D. Data was analyzed using software SPSS Version 25. Descriptive statistics was used for numerical variables like Hb%, Ferritin. Frequency and percentages were used for categorical variables like gender. Spearman's correlation was used for categories of gender in the recipients and donors.
Results: The total number of the donors was 279, about 243 donors hemoglobin was available on the record. Mean with SD of Hemoglobin of donors was 11.59 g/dl± 1.48. Mean with SD of

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Hemoglobin of the recipients was 8.19 g/dl± 1.72. The frequency of the blood Group in Donors were; O+ (155, 55.6%), A+ (51, 18.3%), AB+ (23, 8.2%), B+ (22, 7.9%), O- & A- each (10, 3.6%), and B- &AB- each (4, 1.4%). The frequency of Rh positive blood group was 89.94% (251), and Rh negative was 10.03% (28).
Out of total 272(97.5%) of the Donors were males while only 7(2.5%) were female donors. Out of the recipients 206(73.8%) were females and 73(26.2%) were males. Spearman's correlation statistics showed that there was a mild downhill and inverse (negative) statistically significant correlation in gender groups of the donors and the recipients.
Conclusion: The frequency of "Rh-positive blood group" was (O, A, AB and B) respectively. Blood Group "O" was recorded in 55% of the donors as major Rh positive blood group in our population. Male gender is main contributor as donor while female gender as major recipient.

Keywords: ABO blood-group system; gender perspective; Nowshera.

1. INTRODUCTION

Each year about 5 million people recieved blood transfusion in the United States. So for in literature about 400 red cells antigen have been identified. The inheritance of these blood group antigens is by Mendelian Fashion. In literature the ABO blood group system was first reported followed by the Rh blood group system. These both systems are vital for purposes of blood transfusion [1].

The prevalence of blood group frequency is important for clinical purposes to help in blood transfusion services; it would also reduce the risk of erythroblastosis foetalis in the neonates [2].

A study from Islamabad reported that overall distribution of different blood groups in the target population of 1,521 donors was 35.50%, 28.27%, 26.89% and 9.34% for blood groups O, B, A and AB respectively [3].

Women gender in general is under presented among the blood donor globally; this difference was statistically significant from the literature reports from Italy [4]. There is also a lengthy interval between the donations in female gender as compared to male gender [4].

This is not applicable for whole Europe, an overview of the European blood donation shows no significant difference in gender groups with exception for Italian population (30% female donors) with male gender dominance [5].

There has been an increase in interest in gender differences in transfusion medicine in the last decade. Many reasons that are quoted in the literature highlight the stress on equality in provision of services and contribution of both gender to quality of life that has led to the birth of gender medicine and gender health in 2008 [6].

In contrast to the above mentioned necessity of gender contribution, there is paucity of gender studies in the transfusion medicine. This has been regarding the effect of gender on raising awareness among the potential donors, encouragement of repeated donations and reports to whether the extracts/components of blood collected from male and female have different effects on the recipients [1,3,6].

Many studies have reported the different proportion of donor in gender groups. One report showed 68% of the donors were males [7].

A study from India reported that out of 508 total blood donors, 421 (82.9%) were males, while 87 (17.1%) were female [8].

A study reported from Faugi Foundation hospital Rawalpindi reported that 97.05% of donors in their study population were males [9].

Present study was therefore designed as to screen the donors for the frequency of different blood groups and gender contribution as donor and recipient in a blood bank study at Qazi Hussian Ahmed Medical Complex, Nowshera.

2. SUBJECTS AND METHODS

This retrospective observational study was carried out in the blood bank of Qazi Hussain Ahmed Medical Complex, Nowshera from 25th April 2019 to 5th Nov 2019. A total of 279 donors were included in the study. Record was taken from available data in blood bank of Qazi Husain Ahmed Medical Complex, Nowshera. Donors & Recipients data were also recorded from the blood issuing form. ABO blood grouping was done by agglutination method using antisera A and antisera B. Rh factor was determined by agglutination method using antisera D.

Assuming a reference population of 100,000 patients was estimated to reside in the

catchment area of our hospital, belonging to district Nowshera of Khyber Pakhtunkhwa, Pakistan. A sample size of 279 was calculated through Raosoft®, an online sample size calculator, with confidence interval of 95%.

All blood donors that reported to the blood bank during study period were included irrespective of age and gender. Selection criteria followed in our blood bank was, age between 18 to 60 years, weight more than 50 kg and the hemoglobin of >11 g/dl. All the Donors are carefully evaluated by consultant hematologists and blood bank medical officer through a detailed medical history and clinical examination. Exclusion criteria followed consisted of any previous history of viral disease like Hep B and C and HIV, drug abuse, body tattooing/needling/piercing, previous transfusion of whole blood or blood component in the 6 months and or any renal, cardiac, pulmonary of hepatic diseases.

All the donors were screened for HBsAg, Anti HCV antibodies and HIV antibodies on ELISA using COBAS 311 (ROCHE) version in our lab after its installation in QHAMC in 2019. Now it is officially mandatory to screen all blood donors with ELISA.

Data was entered in SPSS Version 25. Descriptive statistics was used for numerical variables like Hb, ferritin. Frequency and percentages were used for categorical variables like gender. Spearman correlation was used for categories of gender in the recipients and donors.

3. RESULTS

The total number of the donors was 279, amongst them 243 of the donors hemoglobin was available on the record. Mean with SD of Hemoglobin of donors was 11.59 g/dl+ 1.48. Mean with SD for hemoglobin of the recipients was 8.19 g/dl+ 1.72. The serum ferritin of 171 recipients was available on record. Mean with SD of Serum ferritin was 41.16 ng/l+ 74.28 and SE of mean 5.67 (Table 1).

The frequency of the blood group in donors were; O+ (155, 55.6%), A+ (51.18.3%), AB+ (23, 8.2%), B+ (22, 7.9%). The frequency of the negative groups were; O- &A- each (10, 3.6%), and B- &AB- each (4, 1.4%). (Table 2).

The frequency of Rh positive blood group was 251(89.94%), and Rh negative was 28(10.03%).

The gender distribution in donors and recipients were the eye opener for the researcher. Out of total 272(97.5%) of the donors were males while only 7(2.5%) were female donors. Out of the recipients 206(73.8%) were females and 73(26.2%) were males. (Table 3).

We tried to see the correlation of gender of the donors with gender of the recipients by calculating the correlation coefficient using Spearman's correlation statistics. It was observed that there was a mild downhill an inverse (negative) statistically significant correlation in gender groups of the donors and the recipients. It implies that when there is male predominance in donor groups it would be seen inversely for the recipients with female predominance (Table 4).

4. DISCUSSION

In Pakistan more than 1.5 million bags of the blood are donated each year. Among these donors 65% is from relatives of the patient that is replacement donor while 25% from volunteer donors and about 10% from professional blood donors [10,11].

Human blood is an essential element of human life with no substitute. World health organization estimates state that if 1 person per thousand of population donates blood it is generally the minimum need of a nation to meet the requirement of the blood. The requirement increases in advanced countries with more advanced health systems that require blood for many purposes. The donation rate in developed countries is 3.8/1000 population that reduces to 3/1000 population in the developing countries [12].

In present study the frequency of the blood Group in Donors were; O+ (155, 55.6%), A+ (51.18.3%), AB+ (23, 8.2%), B+ (22, 7.9%). The frequency of the negative groups were; O- &A- each (10, 3.6%), and B- &AB- each (4, 1.4%). In international literature from Tanzania, they have reported that the most common blood group in their population was O (52.3%) and the most rare was AB (3.18%) [13] that strongly coincides with our findings.

Another local study from Bannu Khyber Pukhtunkhwa, reported the frequency of blood groups in their donors as 134 (31.2%), 43 (10.1%), 116 (27%), 136 (31.7%) for blood groups A, AB, O and B, respectively [14].

Table 1. Descriptive statistics of hemoglobin of donors and the recipients and ferritin of the recipients

		Hb of the Donors	Hb of the recipients	Ferritin of the recipients
N	Valid	243	279	171
	Missing	36	0	108
Mean		11.59	8.19	41.16
Std. Error of Mean		.09	.10	5.67
Median		12.00	8.00	9.25
Std. Deviation		1.48	1.72	74.25
Range		12.00	7.30	379.53
Minimum		10.00	3.70	2.07
Maximum		2.00	11.00	381.60

Table 2. Frequency of blood group of donors

		Frequency	Percent	Cumulative Percent
Valid	A+	51	18.3	18.3
	B+	22	7.9	26.2
	O+	155	55.6	81.7
	AB+	23	8.2	90
	A-	10	3.6	93.5
	B-	4	1.4	95
	O-	10	3.6	98.6
	AB-	4	1.4	100
	Total	279	100	

Table 3. Gender distribution in donors and recipients

		Frequency	Percent	Cumulative Percent
Donors	Male	272	97.5	97.5
	Female	7	2.5	100
	Total	279	100	
Recipients	Male	73	26.2	26.2
	Female	206	73.8	100
	Total	279	100	

Table 4. Correlations of gender of the donors with gender of the recipients

			Gender of the donors	Gender of the recipients
Spearman's rho	Gender of the donors	Correlation Coefficient	1.000	-.271**
		Sig. (2-tailed)	.	.000
		N	279	279
	Gender of the recipients	Correlation Coefficient	-.271**	1.000
		Sig. (2-tailed)	.000	.
		N	279	279

***. Correlation is significant at the 0.01 level (2-tailed)*

Iqbal M et al [15] reported the frequency of ABO groups was A+ve, AB+ve, O+ve, A-ve, B-ve, and O-ve was 21.5%, 9.8%, 29.7%, 1.8%, 2.9%, and 2.5% respectively in population of Rawalpindi.

The frequency of Rh positive blood group was 251(89.94%), and Rh negative was 28(10.03%). Another study from Pakistan reported 97.7% of the donors in their set up were Rh positive and 2.3% were Rh negative[11]. The distribution of Rh+ and Rh- blood groups was 92.2% and 7.8% respectively in donor population of Iqbal M et al [15].

Mean with SD of hemoglobinin donors was 11.59g/dl+ 1.48, the same has been reported in

literature with donor selection of Mean with SD of hemoglobin14.65g/dl ± 1.58 [15] that coincides with our findings [16].

In present study, Out of total Donors, 272(97.5%) were males while only 7(2.5%) were female donors. Out of the recipients 206(73.8%) were females and 73(26.2%) were males.

We tried Spearman's correlation statistics and observed that there was a mild downhill an inverse (negative) statistically significant correlation in gender groups of the donors and the recipients.

It implies that when there is male predominance in donor groups it would be seen inversely for the recipients with female predominance. The same has been observed in the Italian population[4.] Another study from Rahim Yar khan published with finding of 97%male donor and 3% female proportion in donors that matches our findings [17].

This gender difference is otherwise minimal in the European countries;

Women donors in Spain are 46%, in Portugal 43%, in Belgium 45.4%, in the Netherlands 50%, in Denmark 50%, in France 50%, in the United Kingdom 53%, and in Finland 55% [18].

The female gender fear is reported as a reason for not donating the blood as fear from pricks, fear from collection process, needles, mistakes, feeling unwell are various factors reported in the literature, that supports that these concerns are more common in female gender and are main obstructers in blood donation in female gender [19,20]. Hence it is clear and expected for our population with male dominance donors, that some differences in motives, with altruism more common in female gender distracts them from the donor category as compared to males.

5. CONCLUSION

We concluded that the frequency of "Rh-positive blood group" in our target population was, O, A B and AB. Blood Group O+ was recorded in 55% of the donors as major Rh positive blood group in our population. Male gender is main contributor as donor while female gender as major recipient.

Suggestion/Recommendations: We need to educate the women on the importance of blood donation, minimize the fear amongst female gender, provide friendly environment in blood taking compartments, train staff on blood collection and using the tools of advocacy, communication and socially mobilize on blood transfusion in under- presented gender group can improve the situation.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Ethical endorsement was obtained from the institutional ethical review board of Nowshera Medical College hospital administration before the execution of this study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/60877