



Prevalence of ABO and RhD Antigen in District Nowshera an Experience in Blood Bank of Qazi Hussain Ahmed Medical Complex Nowshera

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Abstract

Objectives: To screen the donors for the frequency of different blood groups, reason for deferral and comparative analysis of the donation in two consecutive years in blood bank of Qazi Hussain Ahmed Medical Complex Nowshera.

Methodology: This cross sectional study was carried out in the Blood bank of Qazi Hussain Ahmed Medical Complex, Nowshera from 25th April 2017 to 5th May 2019. A total of 3429 donors were included in the study. From each donor blood was collected in strict sterile environment. ABO and Rh blood grouping were done by agglutination method using antisera A, antisera B and antisera D. The frequency of different blood group was recorded. Data was analyzed for percentage calculation.

Results: A total of 3429 donors received in the blood bank for donation. The age range of the donor was from 18 years to 52 years. The mean age was 35 years with standard deviation of 3.24. 3018(88%) of the donors were males and 411(12%) females. The distribution of RhD+ and RhD- blood groups was 89.90% and 10.09% respectively. The frequency of "RhD+ blood groups in target population" was B: 1226(35.75%), O: 807(23.53%), A: 754(22%) and AB:296(8.63%). The frequency of "Rh Negative blood groups" was: B: 139(4.05%), O: 95(2.77%), A:84(2.45%) and AB: 28(0.82%). The packed cell wastage rate in our blood bank was 185 (5.4%). The donor deferral rate was 0.7% (24cases) due to positive virology. In quarter 2 of 2017, 767 bags received for transfusion due to dengue outbreak in District Nowshera. Hepatitis B Virus was major cause of deferral that was reported in 14 cases followed by HCV Virus in 13 cases.

Conclusion: The frequency of "Rh-positive blood group" was BOA and AB respectively. Blood Group B was noted in 35% of the donors that counted to be the major prevalent Rh positive blood group in our population. Regarding the Rh Negative blood group again the frequency was B,O,A and AB. Blood group B- was prevalent as a major negative blood group in our population that was recorded in 4.05% cases. AB- Blood group was the rare blood group noted in 0.82% of the donors. The main cause of deferral was Hep B virus that was noted in 14 cases followed by HCV virus in 13 case. The total prevalence of the hepatitis in the donors presented to our blood bank was 0.7%.

Keywords: ABO Blood-Group System; Blood Grouping and Cross matching/statistics & numerical data; Nowshera

Introduction

Blood Banks evolve save the lives in various emergencies and refers to the process of collecting of the blood, separating the blood contents for different clinical usage, and storing of blood. Healthy and safe Blood transfusion is the vital, and as per American Red Cross statistics, each year about 5 million people are transfused in United States. So far in literature about 400 red cells antigen have been identified. The inheritance of these blood group antigen 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 vitally important 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 neonates². A study on the prevalence of ABO and Rh Group was conducted in tertiary care hospitals of Peshawar and reported that the Rh Positive blood group distribution in their population was B.A.O, AB (31.2%), (10.1%), (27%), (31.7%) respectively. Subjects having B blood group was more prevalent, followed by A and O. Blood group A Rh negative is more common (37.5%) followed by group O (31.3%), group B (28.1%) and group AB 01 (3.1%) [2].

Another 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]. The prevalence of Hepatitis B and C viral infections cannot be ignored in our country. Blood Transfusion of infected blood is one of the important cause of spread of hepatitis. The public health promoters try to control its further spread by increasing public awareness and health education programs regarding safe blood transfusion by selection of healthy blood donors. A study from Rawalpindi reported the sero-prevalence of Hep B and C in blood donors was 2.52%⁴. A study from neighbour country, Iran reported that the frequency of Hepatitis B and Hepatitis C infection in their community based study among the blood donors was 0.40% and 0.18% respectively [5]. Present study was conducted to screen the donor for the frequency of different blood groups, reason for deferral and comparative analysis of the donation in two consecutive years in blood bank of a tertiary care hospital of Nowshera. This is a first ever study of blood donors to be reported from Nowshera.

Material and Methods

A total of 3429 donors were studied as received for blood donation to the blood bank of the Qazi Hussain Ahmed Medical Complex Nowshera. Duration of study was from

25th Apr 2017 to 5th May 2019. Out of total 3018(88%) of the donors were males and 411(12%) were females donors.

All blood donors 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 50kg and the Hemoglobin of >11g/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 was any pervious 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 was done on Immunosorbant Assay (ICT) while later on after Dec 2018 the screening was done through ELISA using COBAS 311 (ROCHE) version in our lab after its installation in QHAMC in Nov 2018 and now its official mandatory here to screen all blood donor with ELISA. Computerized record of all patients was maintained in specific software installed in the hospital and all findings were analyzed statistically and percentages were calculated for different parameters.

Results

A total of 3429 donors received in the blood bank for donation. The age range of the donor was from 18 years to 52 years with mean age of 35 years with standard deviation of 3.24. 3018(88%) of the donors were males and 411(12%) were females. The frequency of RhD⁺ and RhD⁻ groups among the donors was 89.90% and 10.09% respectively.

The frequency of "Rh Positive blood groups" was B: 1226(35.75%), O: 807(23.53%), A: 754(22%) and AB:296(8.63%). The frequency of "Rh Negative blood groups" was: B: 139(4.05%), O: 95(2.77%), A:84(2.45%) and AB: 28(0.82%) (Table 1). Out of total donations 3429, 185 (5.4%) bags expired in the last two years, 24(0.7%) was donor deferral rate due to the positive virology. 88.48% (3034) bags were issued for transfusion after verification/screening and cross match (Table 2). While comparing the four quarters of the two consecutive years for donation it was noted that in quarter 2 of 2017, 767 bags (maximum number recorded in all eight quarters) received for transfusion due to dengue outbreak in District Nowshera (Table 3). Hepatitis B Virus was main cause of deferral that was reported in 14 cases followed by HCV Virus in 13 cases. In one case malarial parasite was reported on smear and was deferred to be transfused (Table 4).

Blood group	No of donors	Percentage
B+	1226	35.75
O+	807	23.53
A+	754	21.99
AB+	296	8.63
B-	139	4.05
O-	95	2.77
A-	84	2.45
AB-	28	0.82
Grand Total	3429	

Table 1: Frequency of ABO and Rh D Blood groups of donors presenting to the blood bank of Qazi Hussain Ahmed Medical Complex Nowshera.

Blood bank status	No of bags	Percentage
Issued	3034	88.48
Expired	185	5.4
Verified (screened)	184	5.37
Deferred	24	0.7
Un-verified (fresh received)	2	0.06
Grand Total	3429	

Table 2: Storage Status in Blood bank of QHAMC Nowshera.

Qtr1	No of Donors	Year	Quarter
Qtr1	411	2017	Apr-Jun
Qtr1	339	2018	Apr-Jun
Qtr2			
Qtr2	767	2017	Jul-Sep
Qtr2	311	2018	Jul-Sep
Qtr3			
Qtr3	546	2017	Oct-Dec
Qtr3	339	2018	Oct-Dec
Qtr4			
Qtr4	280	2018	Jan-Mar
Qtr4	436	2019	Jan-Mar
Grand Total	3429		

Table 3: Comparison of the quarters and donors frequency.

Reason for defer	No of cases	Percentage
Hbs Ag positive	14	50
HCV Ab Positive	13	46.43
MP Positive	1	3.57
Grand Total	28	

Table 4: Cause of deferral of donor.

Discussion

Blood transfusions have been used in medical practices since 1930 for various clinical indications. Soon after blood banks introduction for better storage and safe transfusion, the use of blood become more common in clinical set ups. 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 [6-8]. Besides of the screening of the donors with highly specific and sensitive methods for different viruses and micro-organisms the transmission of virus through blood transfusion is yet to be contend is yet to be controlled and is a challenge for the clinicians and hematologists as these virus remains undetectable because of the prolonged incubatory period so that a person can become potentially infected after long before sero-conversion [9].

In present study a total of 3429 donors were received in the blood bank of QHAMC. The age range of the donors was from 18 years to 52 years with mean age of 35 years with standard deviation of 3.24. 3018(88%) of the donors were males and 411(12%) were females. The frequency of RhD+ and RhD- groups was 89.90% and 10.09% respectively. The frequency of "Rh Positive blood groups" was B: 1226(35.75%), O: 807(23.53%), A: 754(22%) and AB: 296(8.63%). The frequency of "Rh Negative blood groups" was: B: 139(4.05%), O: 95(2.77%), A: 84(2.45%) and AB: 28(0.82%).

Another study from the Rawalpindi-Islamabad coincides in its findings with ours that reports that among volunteer blood donors 3519(79.5%) were males and 907(20.5%) were females. B+ve Blood group was the most common (31.2%) blood group. 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. The distribution of Rh+ and Rh- blood groups was 92.2% and 7.8% respectively in their population [10]. Going through the international literature from Tanzania, they reported that the most common blood group in their population was O (52.3%) and the most rare was AB (3.18%). 97.7% of the donors in their set up was Rh positive and 2.3% were Rh negative. Most donors were in the

age range of 19-29 years. The male to female ration among the donors was (88.1%):11.90 [11] that strongly coincides with our findings. Another study from Islamabad was coinciding with our findings, they published that among ABO blood groups the most prevalent was B (33.5%), followed by O (31.3%), A (22.5%) and AB (12.4%) [12].

An ethnic and cast based study from Pakistan army newly recruited staff shows that distribution of ABO group in Arains cast was: B, O, A, AB 40.5%, 25.6%, 24.7% & 9.2% respectively. In Awans: O, B, A, AB, 36.5%, 31.7%, 22% & 9.9% respectively. In Rajputs: O, B, A, AB, 35.1%, 33.2%, 23% & 8.8%. In Balochs: O, B, A, AB, 40.9%, 27.9%, 23.3% & 7.8, in Sindhis: O, B, A, AB, 36.5%, 31.8%, 24.9% & 6.9%. In Kashmiris: O, B, A, AB, 33.6 %, 32.5%, 23.7% & 10.2% and in Pathans: O, B, A, AB, 35.4%, 31.4%, 24.3% & 8.9% respectively [13].

Viral sero-prevalence in our study was 0.7%. Hepatitis B Virus was main cause of deferral that was reported in 14 cases followed by HCV Virus in 13 cases. A study from the hospital of Rawalpindi and Islamabad reported that Prevalence of Hepatitis B was 2.45% in their donors with a male gender predominance while that of Hepatitis C was 2.52% [4]. A retrospective study from Iraq reported that out of the total sampling 495,648 blood donors, only 3258 (0.6%) were positive for hepatitis B and 933 (0.3%) were positive for hepatitis C, [14] that coincides with our findings.

The common transfusion transmissible viruses are Hepatitis B and HCV virus. The transmission of viral hepatitis B and C can be reduced by screening blood of donors for HBsAg and anti-HCV by Elisa prior to transfusion. Screening blood for HCV antibodies was introduced in Iraq in 1995. The overall prevalence of anti-HCV among Iraqi blood donors was 0.26 [15].

In 2nd quarter of 2017 that is Jul-Sept 2017 of this study period, the donations dramatically increased because of prevalence of dengue in Nowshera and increased in the demand of packed cell transfusion and fresh frozen plasma, where we had published our work on dengue prevalence in Nowshera [16]. In our study the packed cell wastage rate was 5.4%. The average expiry rate in blood bank is reported for packed cell wastage in hospitals ranging from 1.93% to 30.7% [17], which coincides with our findings.

Conclusion

The frequency of "Rh-positive blood group" in our target population was B,O,A and AB. Blood Group B+ was recorded as major prevalent Rh positive blood group in our population. Regarding the Rh Negative blood group again the distribution of blood group was B,O,A and AB. AB- Blood group was the rare blood group noted in 0.82%

of the donors. The main cause of deferral was Hep B virus followed by HCV infection. The prevalence of the hepatitis in the blood donors was 0.7% in this hospital based study. The expiry/wastage rate of packed cell was comparable to other national and international blood banks and their reported facts and figures. To control the spread of viruses in blood transfusions there is need for public awareness through advocacy, communication and social mobilization and health education activities and selection of healthy and young blood donors should be encouraged.

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