Study Of Blood Donors Characteristics At Teaching Hospital, Western India

Dr. Piyush Patel *, Dr. Sangeeta Patel **, Dr. Manoj Patel ***

*Associate Professor, ** Assistant professor, Department of Microbiology, *** Assistant professor, Department of pathology, GMERS Medical College, Gandhinagar, Gujarat- 382012 India.

Abstracts: Background & Objective: Blood is an amazing fluid. Blood is obtained only from healthy human being, till date we are not able to prepare blood artificially and no effective substitute is invented. Blood donor is the main brick on which whole building of blood transfusion service is standing. Blood transfusion considered life saving measure to patient if used appropriately but at the same time it is harmful and potential vector of transfusion transmitted infection like HIV, Hepatitis B, Hepatitis C, syphilis, malaria and many others. Methodology: The present study was carried out at blood bank of GMERS medical college and hospital, Gandhinagar, Gujarat, India. The period of the study included 6 calendar years from 1st January 2009 to 31st December 2014.whole blood was collected from voluntary and replacement blood donors after following stringent screening criteria. Blood donor details like age, sex, weight, hemoglobin, blood group and transfusion transmitted infections status were noted. Results: Whole blood was collected from 14276 blood donor during study period. Out of them voluntary blood donors were 12606(88.30%) and replacement blood donors were 1670(11.70%). Total male donor and total female donor were 13266(92.93%) and 1010(7.07%) respectively. Age group 21-25 years blood donors donated maximum numbers 3418(23.94%).prevalance of B blood group 5373(37.64%) followed by O blood group 4321(30.27%), A blood group 3262(22.85%), AB blood group 1319(9.24%).out of 14276 transfusion transmitted infections tested blood units, 70(0.5%) blood units were positive for transfusion transmitted infections. Conclusion: Even Among all types of blood donors Voluntary blood donors are major part. Blood donor in Age group 18-30 years are the major source of blood collection. B positive is the most common and AB positive is least common blood groups. Seropositive prevalence of Transfusion transmitted infections in blood donor is 0.5% in all blood donors. HBsAg is the most common transfusion transmitted infections in blood donors. [Patel P NJIRM 2015; 6(4): 56-62]

Key Words: blood donor, blood groups, transfusion transmitted infections.

Author for correspondence: Dr. Piyush Ashokbhai Patel,13,Mandakini society K.K.Nagar Road ,Ghatlodiya,Ahmedabad-380061. Email: piyush_doctor@yahoo.co.in

Introduction: Blood is an amazing fluid .Blood is the most precious and unique gift that one humanbeing can give to another human being. It is a liquid connective tissue that carries oxygen and carbon dioxide (blood gases) from lung to the tissue. Wake and cutting[1] postulate that the Blood demand will increases in future.

The blood transfusion service is the very vital component of healthcare services used in a broad range of hospital procedures, accidents, emergency obstetric services, and other surgeries. The demand for blood is increasing day by day because of urbanization and industrialization, road traffic accidents, advancement of medical science, advancement of surgical procedure like cardiac surgery, transplant surgery. So there is and there will be constant need for blood in future.

Blood is obtained only from healthy human being, till date we are not able to prepare blood artificially and no effective substitute is invented so blood donor is very precious. Blood donor is the main brick on which whole building of blood transfusion service is standing. Without blood donor the whole blood transfusion service is hopeless.

Blood transfusion considered life saving measure to patient if used appropriately but at the same time it is harmful and potential vector of transfusion transmitted infection like HIV, Hepatitis B, Hepatitis C, syphilis, malaria and many other.[2] The primary responsibility of blood transfusion services is to provide safe, sufficient and timely supply of blood and blood products. At the same time the blood transfusion services should ensure the blood donation is safe and causes no harm to the donor.[3, 4, 5] In the world especially in developing countries there is constant need of demand of blood than the supply. There is imbalance in blood demand and blood supply. Due to increase in prevalence of lifestyle diseases it is feared that the potential blood donor will decrease in future and at the same time blood recipient will increase due to increase in life expectancy. The term Blood donor is include donor of whole blood ,red cells,

platelets, plasma and other blood components donated as whole blood and/or through apheresis[6]. There are three types of blood donation voluntary blood donation, replacement blood donation and professional blood donation. Voluntary blood donation is the donation of whole blood or plasma voluntarily without inducement or reward.[8] Replacement donor is a person who donates blood upon the request of a specific patient or patient's family or acquaintance which, in principle is intended to be used specifically for the treatment of that patient.[9] Professional blood donation has high possibility of transmitting transfusion transmitted diseases, which endanger patient life. In India professional blood donation is considered illegal. Voluntary non-remunerated blood donors are the foundation of a safe, sustainable blood supply. The safety and availability of the blood and blood products require the recruitment and selection of voluntary non remunerated blood donor, the quality assured screening of all donated blood and the safe ,rational clinical use of the blood and blood products. It is important to ensure that the blood collection process does not harm either the donor or the recipient. This is achieved by having donor deferral criteria and stringent screening of collected blood for possible Transfusion transmitted infections.

As per National AIDS Control Programme Phase III findings, there is a serious mismatch between demand and availability of blood in the country: Against 8.5 million units/year requirements, the availability is only 4.4 million units/year of which voluntary blood donation is only 52%.[7]

As per guideline of ministry of health and family welfare government of India under the drug and cosmetic act 1945 amended from time to time all the blood donation are to be screened against five major Transfusion transmitted infections like HIV1 and 2,HBsAg,HCV,syphilis and malaria.[10,11]

This study is carried out to know details of blood donor according to age ,gender ,voluntary, replacement blood groups , seropositive prevalence of transfusion transmitted infections like HIV, HBsAg ,HCV, syphilis and trend and pattern of blood donation.

Material and Methods The present retrospective study was carried out at blood bank of GMERS medical college and civil hospital, Gandhinagar, Gujarat, with prior permission of ethic committee. The period of the study included 6 calendar years from 1st January 2009 to 31st December 2014.we included all the blood donor that have donated blood inhouse in the blood bank as well as in outdoor blood donation camp. We have included blood donors that have donated whole blood. The preliminary details of blood donor name, age, sex and weight is noted.

The blood is collected either from voluntary donor and replacement donor. We have stringent procedure of blood donor selection as per guideline given by FDCA, NACO, and NBTC. The donors have to fill donor registration form which includes demographic, personal and medical history details. Then after we select the blood donor by the process of registration, predonation councelling, medical history taking, physical examination and Hemoglobin estimation.

On completion of blood donation we are performing blood groups and TTI testing like HIV, HBsAg, HCV, syphilis and malaria on each and every blood units. We screen HIV, HBsAg , HCV by third Generation ELISA, syphilis by anti TP antibody method and malaria by slide test. All these records were obtained from blood bank registers and noted on specially formed proforma, tabulated, analyzed and compared with the similar studies by other authors.

Results: It can be seen from table no 1 that total blood donors is 14276 between the years 2009 to 2014.The blood collection increases gradually as the years passes. out of 14276 blood donors total male donor are 13266(92.93%) and total female donor are 1010(7.07%).voluntary blood donors are 12606(88.30%) and replacement blood donors are 1670(11.70%).majority of blood donors either voluntary or replacement blood donors are male.

Table 1: Types and gender wise distribution of blood donors

Years	VOLUNTARY					REPLACEMENT			TOTAL MALE	TOTAL FEMALE	GRAND TOTAL
	INHOUSE		CAMP		TOTAL VOL			TOTAL REP			
	MALE	FEMALE	MALE	FEMALE		MALE	FEMALE				
2009	851 (15.22%)	41 (25.79%)	882 (14.61%)	214 (26.19%)	1988 (15.77%)	85 (5.20%)	1 (2.94%)	86 (5.15%)	1818 (87.66%)	256 (12.34%)	2074 (14.53%)
2010	762 (13.63%)	27 (16.98%)	1345 (22.27%)	113 (13.83%)	2247 (17.82%)	37 (2.26%)	0 (0.00%)	37 (2.22%)	2144 (93.87%)	140 (6.13%)	2284 (16.00%)
2011	1162 (20.78%)	23 (14.47%)	859 (14.22%)	165 (20.20%)	2209 (17.52%)	73 (4.46%)	4 (11.76%)	77 (4.61%)	2094 (91.60%)	192 (8.40%)	2286 (16.01%)
2012	1142 (20.43%)	29 (18.24%)	736 (12.19%)	110 (13.46%)	2017 (16.00%)	116 (7.09%)	2 (5.88%)	118 (7.07%)	1994 (93.40%)	141 (6.60%)	2135 (14.96%)
2013	785 (14.04%)	25 (15.72%)	1244 (20.60%)	71 (8.69%)	2125 (16.86%)	521 (31.85%)	20 (58.82%)	541 (32.40%)	2550 (95.65%)	116 (4.35%)	2666 (18.67%)
2014	889 (15.90%)	14 (8.81%)	973 (16.11%)	144 (17.63%)	2020 (16.02%)	804 (49.14%)	7 (20.59%)	811 (48.56%)	2666 (94.17%)	165 (5.83%)	2831 (19.83%)
TOTAL	5591 (44.35%)	159 (1.26%)	6039 (47.91%)	817 (6.48%)	12606 (88.30%)	1636 (97.96%)	34 (2.04%)	1670 (11.70%)	13266 (92.93%)	1010 (7.07%)	14276(100.00%)

Age groups and gender wise distribution of blood donors is shown in table No.2.it can be seen that out of 14276 total blood donors , age group 21-25 years constitute the highest blood donors 3418(23.94%) followed by 26-30 years 2563(17.96%) , 18-20 years 1801(12.61%), 31-35 years 1977(13.85%),36-40 years 1738(12.18%), 41-45 years 1291(9.04%), 46-50 years 781(5.47%),51-55 years 406(2.84%)55-65 years 302(2.11%) respectively. Majority of male and female blood donors are in 21-25 years age group.

The Month and year wise collection of blood of blood is shown in table no. 3.it shows that blood collection during summer season March, April, May, June there is decrease in blood collection while during rainy season it is high.

Blood groups distribution of blood donors is shown in table no.4. it can be seen out of 14276 blood donors B blood group 5373(37.64%) is the most common blood group followed by O blood group 4321(30.27%), A blood group 3262(22.85%), AB blood group 1319(9.24%).Rh positive blood group constitute major part comprising of 13541(94.85%) and Rh negative blood group comprising of 735(5.14%). B positive 5069(35.51%) is the most common and AB negative 68(0.47%) is the least common blood group. There is no major difference in prevalence of blood groups in male and female.

Table 2: Age groups and gender wise distribution of blood donors

Age group (Yrs.	Male (%)	Female (%)	Total (%)
18-20	1670 (12.59%)	131 (12.93%)	1801 (12.61%)
21-25	2991 (22.55%)	427 (42.24%)	3418 (23.94%)
26-30	2476 (18.67%)	87 (8.62%)	2563 (17.96%)
31-35	1873 (14.12%)	104 (10.34%)	1977 (13.85%)
36-40	1608 (12.12%)	131 (12.93%)	1738 (12.18%)
41-45	1212 (9.14%)	78 (7.76%)	1291 (9.04%)
46-50	728 (5.49%)	52 (5.17%)	781 (5.47%)
51-55	406 (3.06%)	0 (0.00%)	406 (2.84%)
56-65	302 (2.27%)	0 (0.00%)	302 (2.11%)
Total	13266 (92.93%	1010 (7.07%)	14276 (100.00%

Table 3: Month and Year wise distribution of blood donors

Months	Year						Total
	2009	2010	2011	2012	2013	2014	
January	255	204	116	179	278	140	1172(8.21%)
February	112	160	315	145	65	172	969(6.79%)
March	183	84	121	155	220	243	1006(7.05%)
April	150	221	214	257	188	235	1265(8.86%)
May	129	140	152	182	180	175	958(6.71%)
June	141	188	176	171	179	308	1163(8.15%)
July	236	242	259	199	231	239	1406(9.85%)
August	200	256	246	191	334	277	1504(10.54%)
September	91	319	169	167	345	282	1372(9.61%)
October	172	93	156	172	260	282	1135(7.95%)
November	277	163	184	112	120	184	1040(7.28%)
December	128	214	178	205	266	294	1285(9.00%)
Total	2074	2284	2286	2135	2666	2831	14276(100.00%)

Table:4 Blood group wise distribution of blood donors

ABO blood group		Male	Female	Total	Rh Positive	Rh Negative	Grand Total
A	A positive	2909(21.93%)	223(22.08%)	3132(21.94%)	3132(23.13%)	130(17.67%)	3262(22.85%)
	A negative	122(0.92%)	8(0.79%)	130(0.91%)			
B	B positive	4709(35.50%)	360(35.64%)	5069(35.51%)	5069(37.44%)	304(41.34%)	5373(37.64%)
	B negative	281(2.12%)	23(2.28%)	304(2.13%)			
AB	AB positive	1174(8.85%)	78(7.72%)	1252(8.77%)	1252(9.24%)	68(9.19%)	1319(9.24%)
	AB negative	64(0.48%)	4(0.40%)	68(0.47%)			
O	O positive	3794(28.60%)	294(29.11%)	4088(28.63%)	4088(30.19%)	234(31.80%)	4321(30.27%)
	O negative	214(1.61%)	20(1.98%)	234(1.64%)			
Total		13266(92.93%)	1010(7.07%)	14276(100%)	13541(94.85%)	735(5.14%)	14276(100.00%)

Table :5: Transfusion transmitted infections distribution in blood donors

year	Total collection	HIV	HBsAg	HCV	syphillis	Total
2009	2074(14.53%)	3(0.14%)	5(0.24%)	0(%)	2(0.10%)	10(0.48%)
2010	2284(16.00%)	0(0.00%)	7(0.31%)	0(%)	0(0.00%)	7(0.31%)
2011	2286(16.01%)	4(0.17%)	6(0.26%)	0(%)	1(0.04%)	11(0.48%)
2012	2135(14.96%)	2(0.09%)	10(0.47%)	0(%)	3(0.14%)	15(0.70%)
2013	2666(18.67%)	4(0.15%)	9(0.34%)	0(%)	7(0.26%)	20(0.75%)
2014	2831(19.83%)	1(0.04%)	4(0.14%)	0(%)	2(0.07%)	7(0.25%)
Total	14276(100.00%)	14(0.10%)	41(0.29%)	0(%)	15(0.11%)	70(0.49%)

Table no.5 shows Seropositive status of Transfusion transmitted infections in blood donors. Out of 14276 blood donor the Seropositive prevalence of Transfusion transmitted infections are 70(0.49%).among all Transfusion transmitted infections Seropositive prevalence of HBsAg 41(0.29%) is most common followed by syphillis 15(0.11%) and HIV 14(0.10%) are almost equal. There is no any single HCV seropositive blood donor.

Discussion: The primary objective of the blood transfusion service is to provide adequate, safe and effective blood to the needy patients. Blood which is not created artificially, it is only obtained from

blood donor. So blood donor is very precious. To know pattern of blood procurement is very much necessary to provide effective and optimum blood transfusion service to needy patients.

Table no 1 shows trend of blood collection over 6 years. It shows out of 14276 blood donors voluntary blood donors are 12606(88.30%) and replacement blood donors are 1670(11.70%). total male donor are 13266(92.93%) and total female donor are 1010(7.07%).This is due to female donor is not come forward to donate blood because of social taboo. It is also due to low HB level, high prevalence of anemia in child bearing age, menstrual cycle, low body weight and lack of adequate nutrition.

This finding is consistant with the study done by K L Shoba et al[12], kongara shruti et al[13] in south India and Vanita Ahuja et al[14] in north india and WHO global database on blood safety.[15]

In our study we have 12606(88.30%) voluntary blood donation is and replacement 1670(11.70%). voluntary blood donation is more in our study than the our country average, Because we are regularly conducting outdoor blood donation camp as well as inhose blood donation due to active participation of camp organizers, NGOs, government offices, education institutes, religious bodies in our city. This is also due to high level of donor awareness about blood donation among people. This finding is same as in the study done by K L Shoba et al[12], kumar et al[16], Unnikrishnan et al[17] in india.this is in constrast with the study done by kongara shruti et al[13] in which voluntary blood donors is 24% and replacement blood donor is 76%.

Table 2 shows seen that out of 14276 total blood donors , age group 21-25 years constitute the highest blood donors 3418(23.94%) followed by 26-30 years 2563(17.96%). This finding is same as in the study done by K L Shoba et al[12], Unnikrishnan et al[17] , Das K et al[18].This is also consistant with the finding of WHO[15] reported that low, medium income countries and in developing country like india major group of blood donors are below 44 years while blood donors above 44 years is in majority in high income counties and developed world.

Table no. 3 shows that blood collection during summer season march, april, may, june there is decrease in blood collection while during rainy season it is high. This is because there is less number of outdoor blood collection camps in summer season. In rainy season blood collection is increases due to outbreak of vector born disease like malaria blood demand is high so we have inhouse replacement collection is also high during rainy season. Table no.4 shows seen out of 14276 blood donors B blood group 5373(37.64%) is the most common blood group followed by O blood group 4321(30.27%), A blood group 3262(22.85%), AB blood group 1319(9.24%).Rh positive blood group comprising of 13541(94.85%) and Rh negative blood group comprising of 735(5.14%). B positive 5069(35.51%) is the most common and AB negative 68(0.47%) is the least common blood group.This finding is similar to the study in eastern Ahmedabad[19] and Punjab[20]and constrast to the finding of the study done by K L Shoba et al[12], kongara shruti et al[13], Periyavan A et al[21], Das P K et al[22] in various part of south india in which O blood group is most common. Our finding is also in contrast with the study done in foreign countries like britain[23], USA[24] where Rh negative blood group prevalence is 15-17% which is more than our country. Table no.5 shows out of 14276 blood donor the seropositive prevalence of Transfusion transmitted infections are 70(0.49%). In our study the seropositive prevalence of Transfusion transmitted infections is low as compared to other study because of we have majority 88.30% voluntary blood donors and 11.70% replacement blood donor.Among all Transfusion transmitted infections seropositive prevalence of HBsAg 41(0.29%) is most common. This finding is similar to the study done by dayal et al[25], bhavani et al[26], jasani et al[27].this is in contrast to the finding of study done by by gupta et al[28] in which HCV is the most common Transfusion transmitted infections in blood donors.

Conclusion: Among all types of blood donors majority of the blood donors are voluntary donors. There is dominance of male blood donor than female blood donors. Blood donor in Age group 18-30 years are the major source of blood collection. Blood collection is less in summer season. B positive is the most common and AB negative is

least common blood group. Seropositive prevalence of Transfusion transmitted infections in blood donor is 0.5% in all blood donors. Among all Transfusion transmitted infections HBsAg is the most common.

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